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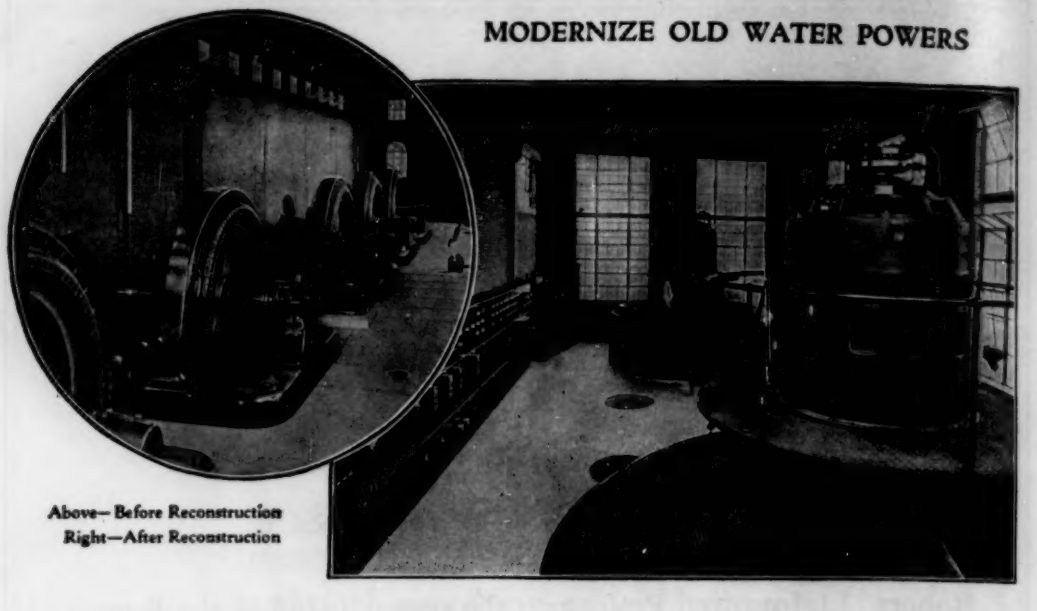

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INTERNATIONAL CARTELS[1]

By ROBERT LIEFMANN

IT has been frequently asserted, especially in Germany, that the high point of the cartel movement has been passed, and that future development will be more in the direction of trusts and complete amalgamations of large enterprises. In general, this is scarcely correct. In the majority of European countries, particularly in France, Italy, and in economically less developed countries, the cartel movement is only in its beginnings. Although in Germany the combination of huge unit enterprises into trusts is at present particularly noticeable, nevertheless it is occurring in only a relatively small number of industries. Even in those, cartels still retain an important place. Only in a very few branches of industry is it possible that a single unified enterprise may include the whole industry. Where there are several enterprises, there will always be efforts toward mutual understanding through cartels.

However, there is a field in which the formation of cartels has doubtless not yet reached the high point; namely, that of international cartels, which include enterprises domiciled in various countries. Some such have existed for decades. In my book, *Die Unternehmerverbände,* published in 1897, 40 such agreements were mentioned which had come into existence up to 1896.[2]

Since that time the cartel movement has taken long steps forward in Germany and particularly in many other countries. International cartels have also multiplied, and although they declined during the war, as would be expected, they have since grown rapidly in number and importance.

We stand very probably at the present only at the beginning of this movement. The reasons therefor seem to be, first, the arbitrary splitting of hith-

[1] Translation by the Faculty Editor.

[2] Namely for borax, acid ammonia, dyes, soda, lactose, fertilizers, ammunition, rails, pipes, and so forth. German producers have had 22 such with England, 13 with Austria, 10 with Belgium, 9 with France. Naturally, this list is by no means complete.

erto combined economic areas, the creation of new states and tariff areas with uneconomical boundaries, and the growing tendency to national combinations in a considerable number of states. Secondly, the increased competition which has been brought about both by the impoverishment of a number of countries, particularly the powers of Middle Europe, which has had as an effect the artificial pushing of manufactures of many types upon the world market; and the technical advances in production which have increased world overproduction more rapidly than purchasing power has increased. Thirdly, the increased intensity of competition occasioned by the falling exchanges of certain countries. In a number of cases this has increased the difficulty of forming international cartels with foreign countries. But since as a rule today "anti-dumping" tariffs threaten the producers in countries with depreciating currency, they cannot count on continued export; therefore they often attempt to come to an understanding with their neighbors through cartels. Finally, as a reason for the rapid increase of international cartels in recent years is the fact that governments and parliaments of a number of countries under the influence of war psychology have often considered too little the economic needs of industry. Producers themselves have had to take things into their own hands by making agreements which extended beyond international boundaries. It is timely, therefore, to discuss problems of international cartels.

I. The Forms of International Cartels

The forms of international cartels are, of course, the same as those of the individual countries; namely, price, production, and territorial division cartels, which, of course may be combined. Also there are the three more highly organized forms; namely, supply, outlet, and profit-sharing cartels or syndicates. But the relative significance of these forms is not the same in the international field as in the domestic. Furthermore, in international cartels another distinction is important. Two types of international cartels are to be observed: (1) agreements between the national cartels of different countries, and (2) monopolistic agreements directly between the entrepreneurs of several states. Obviously, the latter is possible only where there is extensive concentration of enterprises in few hands or in a market which contains relatively few producers. National organization is usually a prerequisite for international agreements, though this need not appear in the form of the cartel itself. There are cartels which contain both organization and individual enterprises. An instance is the International Incandescent Lamp Cartel in which the French producers, already joined in the *Compagnie des lampes,* are represented as a group, together with the individual enterprises of other countries. Likewise, in the International Aluminum Syndicate the five French producers have a close syndicate among themselves, while the independent enterprises from other countries are also members. In general, the development of international cartels is often made more difficult because the business men in less developed countries have not been able to join in national associations.

The majority of international cartels are still quite loose associations, and with few exceptions have been short-lived. In order of frequency of occurrence the five forms which they assume include, first, pure territorial cartels which reserve to the members of each

country their own respective markets. The second form combines with these agreements concerning the sale in third countries. Such agreements may be simple price agreements, or may allot the sale to these countries. Price agreements, the third form, with agreements as to territory, production, or sales, are less common. Seldom does one find limitation of production, the fourth form, because usually international cartels have no power to enforce it. Just as uncommon is the fifth, the syndicate, with a division of orders or profits which covers the whole selling territory. Such exist chiefly for certain chemical products, such as bismuth, borax, and so forth. The International Mirror Syndicate involves not only an agreement as to sales quotas in third countries, but also international regulation of total production.

From genuine cartels, that is, associations with monopolistic purposes, are to be differentiated, first, those associations in which the members obligate themselves to a particular task or undertaking, but without monopolistic purpose; secondly, the economic trade associations which aim at a common effort in the particular branch of industry; and finally, those concerns and trusts which present a financial combination of several enterprises, a trust at any rate with monopolistic purpose. All of these organizations may appear also as international organizations. Particular associations cannot be readily classified as being one or the other, because they may combine several functions.

International trade associations existed long before the war. Especially to be mentioned is the International Association of Cotton Spinners, which, under English guidance, has been active in procuring statistics and information concerning production and sales conditions in the various countries. Frequently special associations pursue primarily technical objects, but also deal with economic matters, such as setting of standards, types, classification of goods, questions of raw material procurement, transportation costs, production and sales statistics, and so forth. International conferences are often preliminary steps to such international agreements. Among these may be mentioned the World Power Conference, the first of which took place in the summer of 1924 in London, the second held in September, 1926, in Basle; or to mention only the major industries, the World Conference of the Leather Industry soon to be held in London, with which several international associations have already become affiliated. Such international trade associations occur also in manufacturing industries which are little adapted to combination, such as the recently organized Union of the Office Appliance Trades Association, which includes the office appliance manufacturing industries of all European countries.

One type of cartel association is still to be mentioned; namely, that connected with patent utilization. Such organizations present a combination of licensed monopolies, patents, and of the contractual arrangements of cartels. For with the license of a patent to other enterprises, for instance, for the production of patented products, agreements are commonly made concerning the maintenance and exploitation of the monopoly position. This applies not only to licenses in the domestic field, but even more in the disposition of licenses to enterprises in other countries. Territorial agreements, through which the sales territory of the licensee is limited, are a frequent accompaniment, likewise agreements as to price and

terms of sales. The number of such patent utilization cartels, which corresponds to the frequency with which patents are taken up in different countries, is obviously very large. Among the international cartels which are the results of contracts between individual firms, these are in all probability the most numerous.

II. Historical Sketch of International Cartels

Any sketch of the history of international cartels must be very incomplete. If one includes under international cartels those between the subjects of different states, the oldest German cartel, the Neckar Salt Association of 1860, was international because salt concerns in Wurttemberg, Baden, and Hesse belonged to it. Likewise, one of the oldest cartels of the iron industry was international because both Luxemburg and Lorraine belonged to the Pig Iron Association of 1879. More strictly speaking, international cartels are those in which the member enterprises belong to different customs areas. Up to the 70's only the Bismuth Association is known as international, the very small number of producers having made possible such agreement. To the oldest of international cartels belongs also the first international rail cartel, which came into existence in 1884. The sharp decline of railroad building after the most important roads had been constructed, together with the marked increase in production, led to 10 years of competitive warfare, which was ended for a short time by the combination of German, Belgian, English, and French producers. Steel producers from the same countries established a closely organized selling syndicate first in 1904 after the formation of the German steel syndicate. A sales office was established in London (which is now being re-established), and orders were divided according to agreed quotas of the world market, while the individual countries reserved the home market and certain other markets to themselves.[3]

In the years immediately preceding the war the cartel had to struggle with difficulties especially because of American producers. The agreements naturally came to an end when the war began. After the war, with the loss of Lorraine, the cession of the Saar Valley to the French, and of the Luxemburg production to the Belgian customs territory, German rail production fell at least 50%. While it was placed at 2.4 million tons in the old Steel Works Union, it amounted now to less than a million tons. The production in the years 1922 to 1924 can scarcely be considered as a basis for the German quota. So it is clear that there were extraordinary difficulties in the way of international agreement in this field.

In the iron industry[4] two other prod-

[3] It is remarkable that in 1905 the American rail mills entered, although they at that time were also joined together in a pool. The syndicate endured the shock of the pool's early dissolution; in the following year the Austro-Hungarian, the Spanish, and the Russian establishments also entered. Participations were about 37% for England, 25% for the United States, 20% for Germany, the remainder being divided between the mills of the remaining states. The English and the French members had the privilege of supplying their colonies, although only within their participation figures; the Germans had prior right to the sale in Sweden, Norway, and Denmark. North America was reserved for the United States, though in South America a special arrangement for dividing sales between all of those in the cartel was provided.

[4] Iron bars, pipe, rolled wire, wire tacks, and many other iron wares were subjects of international cartels prior to the war, mostly between Germany and Austria, Germany and Belgium or England. Most important of these were undoubtedly the pipe cartels. After special cartels for

ucts are to be mentioned, which frequently and for long periods have been the subjects of international combination; namely, wood screws and enamel ware. The first wood screw cartel, which was formed at the beginning of the 90's between English, French, and German producers, was a territorial cartel; in 1905 another of the same sort was established, and there appear also to have been several price agreements. In 1926, furthermore, another such cartel has appeared. A cartel of enameled ware factories existed in the 90's between Germany and Austria. In 1903 another was formed together with Belgium, but in 1906 the Association of Enamel Works was founded, with 45 factories in Germany, Austria-Hungary, Switzerland, France, and Italy, as a price and terms of sale cartel. During the war only the German and Austrian enameled-ware works participated.

There have been international cartels for all the other industrially important metals, for raw zinc, copper, and lead, as well as for several semi- and completely manufactured products from these metals. Very numerous are also the international cartels in other mineral industries.[5] The most closely organized cartel of this industry is that for mirror glass. It came into being first in 1903, at the initiative of large French and Belgian producers, and it is noticeable that it began immediately with a general limitation of production. The following year the cartel was reorganized into a selling syndicate, the *Convention internationale des glaceries,* with its office in Brussels. It was formed for a period of five years, but was renewed from time to time up to the war. Since the war it has again come into existence. High penalties have been agreed upon, and three selling offices have been established in the three chief countries. All production figures and all sales are sent to the central office. The close combination in this industry was made possible by the fact that even before the war the relatively few factories were in French and Belgian hands, which today also control 75% of German production.

The most comprehensive cartel of the glass industry, and one of the greatest international cartels, is the European Bottle Cartel, which was founded in 1907 for the acquisition and introduction of the Owens bottle machines, and to which factories or associations in Germany, France, Austria, Bohemia, Hungary, Holland, and the three Scandinavian countries belong.

In the chemical industry the number of international cartels is evidently very large. Only a small part of them have become known to the public, for the most part being agreements among few firms which can easily be kept secret. It is true for many of the domestic cartels of this industry that they are easily formed, but they are also easily dissolved when prices rise rapidly. This applies only to unpatented articles, though the numerous patent utilization cartels in this industry obviously enjoy a strict organization during the life of the patent.

Nevertheless, there are certain inter-

these products and the three countries mentioned had existed, there was formed in 1905 between the German and the American pipe syndicates an agreement on the basis of which Germany withdrew from selling in the United States, Canada, and Mexico. In 1906 there came into existence a pipe cartel between producers in Germany, Great Britain, the United States, and Austria.

[5] Even in the 90's there were several cement cartels between Germany and Austria, Germany and Switzerland, Germany and Belgium. In 1905 these developed to a large association in which England, France, Belgium, and the Scandinavian countries participated.

national cartels in the chemical industry which are very closely organized.[6] The acetic acid producers, closely syndicated before the war, have recently renewed their agreement, and maintain their office at Frankfurt-am-Main. Nearly all of the important European producers in nine European countries are associated. The producers of soda, hypophosphates, wood dye extracts, and a whole series of pharmaceutical products had, even before the war, cartels which went beyond Germany in their membership, though Germany was the chief participant in all.

Of particular interest was the international cartel of the aluminum industry. The number of active producers of raw material was very small. There were before the war only 13 concerns in the whole world, with 23 factories. Of these the five French works were united in a holding company, *L'aluminium français*. The most important European factories, the *Aluminium Industrie A. G. Neuhausen,* operated four plants in Switzerland, Germany, and Austria. By far the greatest producer, the Aluminum Company of America, which in the United States had absolute control, directed also the Canadian factory, the Northern Aluminum Company. Besides these there existed three enterprises in England and Norway which again were closely joined together, and one in Italy. The first cartel covering the aluminum production originated as early as 1901 in an agreement concerning the prices and limitation of production. It had raised prices by 1907 to about double their former figure. The Aluminum Company of America was not a participant, but had a territorial agreement with Neuhausen. Sharp price rises led in 1908 to the dissolution of the cartel, whereupon prices fell to much below their original figure. Therefore, a new cartel was formed in 1912, but not before the French had established the above-mentioned organization, which is not only a sales syndicate for the French works but also operates mills for the further manufacture of its raw product. In competition with the American monopoly a factory was established in the United States, the Southern Aluminum Company, which, however, was soon sold to the Mellon group. It is to be noticed also that the great consumers, such as Krupp, joined in a purchase association opposing the two international aluminum cartels. This reached its end during the war, but is said to have again come into existence.[7]

[6] Outside of the powder cartels, of which more will be said below, and the already mentioned bismuth syndicate, there is to be mentioned the international borax syndicate. In 1899 twelve enterprises with plants in England, the United States, Germany, France, and Austria, united in a holding company, the Borax Consolidated Company, which controls the greatest part of the world's production. It is not known whether the cartel lasted beyond the war.

[7] Various international cartels in which Switzerland participated are discussed in detail in the book by Dr. Robert Jaccard, *Les syndicats industriels en Suisse*, Lausanne, 1925. As early as 1887 cartels were formed between the Swiss and French manufacturers of watch parts and between copper mills. In 1891 German, Swiss, and Austrian linen spinners formed an association in Frankfurt which turned its attention to the unreasonably long credit terms. A great limitation of production was put through first in 1903.

For various watch parts there were cartels between Swiss, German, or French factories. The most remarkable was the International Watch Crystal Convention of 1913, to which three Swiss, three Alsatian, and three Austrian factories belonged, which, with the exception of a factory in Geneva and another in Japan, represented the entire world production and produced daily over 600,000 crystals. It was a price cartel, and it regulated production. It was ended after a comparatively few months by the outbreak of the war.

Jaccard goes into much detail over the interna-

An example of how a national combination of enterprises facilitates the formation of international cartels is furnished by the Incandescent Lamp Syndicate which since 1925 has combined in the Phoenix Company in Geneva.[8] Finally, there is still to be mentioned the prominent field for international cartels that is presented by ocean shipping. According to American statistics of 1913 there were before the war not less than 80 cartels in this field alone.[9]

III. International Cartels since the World War

The increasing importance of international cartels since the World War is to be attributed to various factors, among them the marked decline of the purchasing power of the world market, and coincident increased production because of technical advances. An attempt to create a market for this excessive world production by political measures, particularly by commercial policy, was the less possible since the national animosities caused by the war led nearly everywhere to a drastic severance of old connections and attempts toward increasing self-sufficiency. Consequently, business executives of the different countries as private individuals have made efforts to become mas-

tional cartels for calcium carbide, the first of which was formed in 1901. The one of 1910 enjoyed a longer existence, had its seat in Paris, and comprised 40 enterprises with 61 factories in Germany, Switzerland, France, Holland, and Austria. It was a selling syndicate with two sales offices, one in Germany, the other in England. It established regulations concerning the quality of the product. It likewise ended at the beginning of the war. At the present time there are negotiations in progress looking toward reestablishment.

A still greater number of participants characterized the International Association of Silk Dye plants which was formed in 1906 with its office in Zurich. Sixty-six plants in Germany, Switzerland, and Austria were included. Prices were fixed, dye wages established. Like so many others, this cartel was ended by the war. Among the miscellaneous cartels between Germany and Switzerland were several others in the silk industry; for instance, one in 1907 for veils. In the same year one was formed for sewing silk also, with Italy, and in 1912 one among silk ribbon weavers.

To be mentioned also is the fact that likewise in 1907 was founded the association of German, Swiss, and Austrian bent wood manufacturers, a price cartel which Belgium joined in 1911. After the war the cartel remained in existence between Austria and Switzerland.

This industry is, however, on the way to an international trust, for one of the chief firms in this field, the first Austrian stock company for the production of furniture from bent wood, J. and J. Cohn, in Vienna, united in 1920 its factories in various countries in a controlling company, the *Mundus A. G.* in Zurich with 9 million francs capital. In 1923 was joined also to this the second greatest enterprise of this branch, the firm of Thonet Brothers, of Vienna, with their various factories, so that the *Thonet-Mundus A. G.*, in Zurich, with 15 million francs capital, now comprises 18 manufacturing companies, and controls about 80% of the world production of bent wood. The trust is also vertically very excellently organized. It procures the needed wood from its own forests and produces for its own purposes notably special machines as well as the necessary screws and supplies.

[8] The first incandescent lamp cartel was formed in 1903. The sales office of the United Incandescent Lamp Manufacturers was in Berlin. Because of the unfavorable situation of the industry, German, Dutch, French, Swiss, Austrian, and Hungarian plants, 12 firms in all, united to make up about 90% of the European production. The combination was facilitated further through the fact that the two largest firms, the A. E. G. and Siemens and Halske, had previously come to an understanding. A sales agreement was formed in which the two largest firms receive the same quota of 22.633%. That syndicate was not resultful because in the following year a new competitor, the Bergmann Electrical Works A. G., in Berlin, appeared. It dissolved and was not renewed until the end of the World War. More of that later. Likewise, other international understandings of the nature of cartels will be discussed in Section IV.

[9] Such cartels or shipping pools go back to the 80's of the past century. Out of the Cologne conference of North European steamship lines there appeared in 1892 a cartel for the division of profits from traffic trade to North America, the North Atlantic Steamship Lines Association, to which the Hamburg-American, the North German

ters of the difficult situation. Cartels constituted the most available means. Obviously those territorial cartels which preserve the domestic market to the domestic members are to be distinguished from agreements concerning third countries and from price agreements. The latter usually put an end to a condition of active competition, either generally or in the third countries, although the possibility of price increases is limited by the rise of new enterprises or potential competition from other countries. For a world monopoly, which comprises the great bulk of a world production of a commodity—as a rule one assumes that 80% of the production is necessary for a monopolistic condition—is relatively scarce and in general might exist only for special products of minor importance for the world market. The International Incandescent Lamp Cartel, dating from the World War, was formed after the largest German enterprises had combined in 1919 into the *Osram, G. m. b. H.,* to which the entire production of the A. E. G. (*the Allgemeine Elektrizitäts Gesellschaft),* Siemens and Halske, and the German Incandescent Lamp Company (*Deutsche Gas Glühlichtgesellschaft*) was transferred. Under its influence a world cartel came into existence in 1925, in which became members the General Electric Company, through its subsidiary the International General Electric Company in Paris, the great Dutch plant of Phillips, the French producers through the *Compagnie des lampes,* the three smaller German producers, Bergmann Electrical Company, I. Pintsch Company, and the Radium Company, as well as English, Scandinavian, Italian, and Spanish firms. The combination entitled the Phoenix Company, located at Geneva, aimed in the first place at an exchange of patents and production methods. Territorial division has been essentially agreed upon, but the division of the selling markets following the example of the old syndicate is still in preparation.

An example of how a single large enterprise which extends over several countries facilitates the formation of international cartels is furnished by the glue industry. Here the *A. G. für Chemische Industrie,* formerly *Scheidemandel,* had developed a dominant position in Germany, had established a large purchasing organization, and had created branches and sales offices in

(*Footnote 9 continued from page 135*)
Lloyd, the Holland American Line, and the Red Star Line belonged. Between these companies there developed in 1894 a freight division agreement and in 1896 an agreement also concerning cabin rates. Many of these pools applied only to a given voyage direction, such as that from North European ports to America, but not vice versa. In the year 1902 there followed the formation of the International Mercantile Marine Company and the community of interest between it and the two great German companies, to which there was added a series of further international agreements as well as various competitive battles. In the year 1908 the Atlantic Conference was established through Albert Ballin. This was divided really into four cartels: a profit division cartel of the type of the North Atlantic pool, a steerage agreement, an agreement concerning minimum rates for first class, and finally an agreement for the second class. Not all the companies took part in these agreements. Besides the English and American, also the French, Canadian, Belgian, and Dutch companies were members. The Atlantic Conference was renewed in 1911. The community of interest between the German companies and the International Mercantile Marine ceased. In 1909 the Mediterranean Conference, a larger agreement for the Mediterranean, came into existence, to which 15 companies, German, Austrian, British, American, Italian, French, and Spanish, belonged. This cartel too was divided into several agreements, and there was added in 1911 a freight cartel. Shortly before the war most of these cartels were denounced by the German shipping companies. The outbreak of the war hindered a further agreement and led to a complete shift in ocean shipping relations.

several countries. It controlled also the Austrian glue trust. On its initiative at the beginning of 1926 nearly all European producers except the Dutch have combined in a cartel to prevent underbidding in foreign countries. For the purpose of establishing a strictly organized European glue syndicate, there was organized recently a preliminary commission in which 17 European countries were represented.

Of the major commodities of world trade, copper is best adapted to world monopoly, for the great bulk is produced by a few relatively large enterprises. The copper trade is also highly concentrated in ownership. In the last century a copper monopoly, particularly in the form of a corner through purchase of supplies in order to bring about a temporary speculative price advance, was ended with the collapse of the speculators. More recently a world copper syndicate has been organized to which the great majority of enterprises belong, and which controls 90% of the world production. Among the great American producers are the American Smelting and Refining Company, which in 1925 alone delivered about 25% of the world production; the Kennecott Copper Company, which with its subsidiary companies produced about 16%, and the Anaconda Company, which comes in with about 10% of the world production. Likewise, the great South American and African producers, Cerro de Pasco Company and the *Union minière du Haut Katanga,* as well as the German producers and wholesalers, the Mansfeld Company, and the Metal Company of Aaron Hirsch and Son, are members. Of the greater producers only the American Miami Copper Company, the Spanish-English Rio Tinto Company, and Australian producers, with a combined total of only 10% of world production, are lacking.

The central office of the cartel is the Copper Export Trading Company, in Brussels. In Germany there are six sales agencies, in England and France five each. Occasionally some price regulation is provided, but it applies only to certain grades of copper. Production quotas are to be taken up for consideration. The cartel aims above everything at the elimination of middlemen, who in the opinion of the producers are to blame for the violent price fluctuations of recent years. Customers must, therefore, promise that the copper procured will be used only for their own needs. As a consequence, an active movement against the cartel on the part of the dealers is under way.

A very comprehensive cartel is also that of the magnesite works, to which 99% of all European producers with plants in Austria, Germany, Bohemia, and Italy belong. It is under the leadership of the greatest producers, the Veitsch Magnesite Works Company, of Vienna.

The splitting of hitherto combined economic areas of Europe by the Peace Treaty has furnished undoubtedly the greatest impulse to international cartels since the war. A whole series of cartels between Austrian producers and the various succession states has come into existence. To these belong particularly the different cartels of the iron industry between the Austrian, Bohemian, Hungarian, Polish, and Roumanian producers, and those for ceramic products, for cement, and so forth. In part, the earlier financial combination of enterprises through holding companies established in Switzerland has been retained, as, for instance, the Tarbouches Company, Timber Holding Corporation for Securities of the Lumber Man-

ufacturing Industry, Ofa Lumber Manufacturing Company, Thonet-Mundus Company. However, the very difficult economic conditions which arose from the split of Upper Silesia have, on account of the collapse of the Polish economic structure, not led to lasting agreements between Germany and Poland.

Still more difficult, and one of the most important of European economic problems, is the restoration of the economic connections between the heavy industries of west Germany and those of the neighboring states which are so closely interrelated. Here, through the cession of Lorraine to France, the inclusion of the Saar Valley in the French customs area, and the inclusion of Luxemburg in the Belgian customs area, the fundamental basis for these heavy industries in the particular countries had been so completely shifted that efforts towards understanding soon became extremely pressing. But the methods of force adopted by France in the Rhineland, five years after the end of the war, hindered all attempts to bring about an understanding among business executives. Only after the end of the Ruhr occupation did negotiations begin in earnest. It was more than two years before an agreement came into existence even for crude steel. The recent West European crude steel agreement, *L'Entente cordiale de l'acier,* had for its primary purpose finding an outlet for the existing surplus of crude steel in France, by providing for its further manufacture in Germany, and preventing in France superfluous and costly extension of fabricating plants where similar plants were already available in Germany.

After long negotiations the limitation and allotment of crude steel quotas was agreed upon between producers located in Germany, France, Belgium, Luxemburg, and the Saar Valley. According to the complicated plan, the German quota with low total production is very small, so that the ratio of quota to capacity of the German works is less than in the plants of other countries much enlarged in recent years. Up to a certain limit the German share increases somewhat more rapidly. With a yearly production figure of 29.28 millions of tons, the German share is 43.17%, the French 31.19%, the Belgian 11.56%, Luxemburg's amounts to 8.30%, and the share of the Saar Valley is 5.78%. For each ton of crude steel produced, one dollar is to be paid into the common treasury, and for each ton of production in excess of quota, four dollars. Accountings are made up quarterly. When a country produces less than its quota, it receives two dollars per ton out of the treasury (until the deficiency reaches 10% and this only for a few months).

On the basis of these payments, it is expected that the price-cutting on the world market will be stopped, and that an extension of production will be hindered. A neutral trustee oversees production and accounting. Neither the mutual protection of home markets nor prices have been agreed upon. These have all been reserved for further agreement among the participating countries. It was only after protracted negotiation that agreement was reached which assured to Germany larger quantities of semi-manufactured and rolling-mill products from Lorraine, Luxemburg, and the Saar.

The crude steel association is to remain in effect until April 1, 1931. It may, nevertheless, be denounced earlier if no final trade treaty with France is ratified, or when the already ratified treaties with France and Belgium are

denounced. Notice may be given also in case of a very important decline in sales. More recently there have been negotiations looking toward the entrance of Austrian, Hungarian, Bohemian, Polish, Roumanian, and other steel works which have already formed international cartels among themselves. Negotiations will probably soon be initiated with Sweden, whose steel works are now united in a trust, as well as with England, whereby the whole of the European steel production may in the future be combined in an international agreement.

Independent of these associations, there are already international cartels in the iron industry for rails and pipes, tacks and wood screws; for rolled wire, at present only between Germany, Bohemia, and Austria. Negotiations are in progress with Belgium. Both in Belgium and in England the necessary prior association of domestic producers is lacking. The international price cartel which has been created, to run for three years from July 1, 1926, already includes Germany, France, Belgium, Luxemburg, Bohemia, and Poland. Except for England, these are all the states interested in export; for Italy and Spain can, at the most, supply only their own demands. Members are to have their own domestic markets with quota allotments for sale in outside countries. A central sales office is not provided, the orders going to the various national associations being mutually divided. Its practicability remains to be proved. More recently French and German pig iron producers have come to an agreement whereby the latter take over 10-15,000 bars of pig iron per month.

Of greatest interest, especially for the United States, are the agreements between the German and French potash industries. After the separation of Alsace had broken the German potash monopoly, it was to be expected that the Alsatian potash works, which, because they were owned by German private concerns, were for the most part seized by the victors and came into possession of the French state, would not allow themselves to come into a long competitive battle with Germany, and so destroy the foreign market for both. Nevertheless, not until 1924 was there developed an agreement between German potash syndicates and Alsatian works which at first presented only a reservation of sale in their own particular markets and some agreement concerning import into America and Sweden. In 1925, however, the sale in all parts of the world was placed under regulation, and a comprehensive agreement for sales organization and for advertising work was completed. Again both countries reserved their own home markets. France reserved her colonies. The Alsatian works participate in the remaining sales to the extent of 30%, the German potash syndicate 70%, while according to the agreement concerning America, the relationship is one-third to two-thirds. One of the greatest difficulties in coming to an agreement lay in the fact that while in Germany an immoderate increase in production capacity had been prevented by the potash syndicate, such was not the case in France. It is evident that a cartel naturally cannot be maintained for any length of time when some of the members are continually increasing their production facilities, and demanding ever larger proportions of sales quotas. It is hoped that this outcome will be avoided by the agreement. It is to be assumed that in view of the possibility of larger potash mining developments in Spain and in the United

States, France will find it advisable to exercise care in the extension of her works.

The agreement is at present only for the period of a year, although negotiations are in progress for a much longer contract. On the French side an agreement has been closed between the *Société commerciale des potasses d' Alsace,* the *Mines domaniales de potasse d' Alsace,* and the *Mines de kali Sainte Thérèse.*

In the sale to other countries, the German participation of 70% and the French of 30% apply only to a sale of 8.4 million *Doppelzentner* (roughly 840,000 tons). If the sale to foreign countries goes beyond that, both countries participate equally in the surplus of orders. Since in 1925 the sale to foreign countries reached its high point of only 5.5 millions, this agreement in the near future will have but little practical significance.

IV. Cartels of International Enterprises

One may contrast with international cartels those international concerns which in common usage are frequently called "trusts." While cartels are always monopolistic combinations, it is by no means always true that international concerns possess monopolistic power. Large concerns arrive at such a position only through cartels, and these cartels of international concerns are today of great and growing importance. They comprise, obviously, the great mass of those international cartels which are not made up of national organizations but rather of the individual enterprises of different countries. Large enterprises whose activities have extended over several countries have been in existence for a long time, particularly in trade. In production, true internationality was achieved by gas companies, which since the 60's, as combined enterprises, possessed gas works in various places and established more and more of such companies which they controlled financially. Simultaneously there began in England international mining companies. Since the 70's there have been international tram and narrow-gage railway companies, but the real development began first in the 80's and indeed—if we except certain special cases in a few fields—at about the same time in three industrial branches, dynamite and powder manufacturing, the petroleum industry, and the electro-technical industry. We cannot, of course, discuss the many ramifications and problems of international concerns, but must limit ourselves to cartels, and a few special examples must suffice.

Up to this time no single concern has possessed a world monopoly. Also it is seldom that a single concern has a monopoly position in several countries. The most important example today is the Swedish match trust. It rests upon a combination of the organizing ability of its Swedish founders and American capital power which they knew how to employ unusually well. Aside from the fact that it surpassed older factories through technical improvements in production, that by virtue of its capital power it was in a position to strike or to force them to agreement, and that it is now in process of controlling also the production of match machines, the basis for its success lay in combination of contractual with state monopoly. Through the guaranty of large loans or large annual payments to the state, it has sought in various countries to procure a state match monopoly. It so exploits the situation that the matches have had to carry a very high margin above production costs, without caus-

ing sales to decline appreciably. State monopolies have been secured in Peru, Poland, Portugal, and Greece, while in many other countries, particularly both through underselling previous producers and especially through cartel agreements, it enjoys a virtual monopoly. In Germany it participates to the extent of 65% in the sales of the German operating syndicate, the *Deutsche Zündholz-Vertriebs A. G.*, owning 50% of its capital. The state government has reserved for itself a deciding influence upon prices. The match factories of the German co-operative societies are not limited in their sale to the societies.

Although for a long period before the war such companies as the United Shoe Machinery Company and the National Cash Register Company controlled their respective markets, international concerns have usually succeeded only through agreements with others in securing monopoly control. International combination is, of course, facilitated in an industry in which a very few large international concerns control the world production, such as the petroleum industry.

International expansion of the American petroleum industry began early in the 80's, but at first was directed mainly toward exploitation of sales. The Standard Oil Company, at that time still a trust, founded at the beginning of the 80's several companies, the *Compagnie générale des petroles* in Paris; the Anglo-American Oil Company in England, the *Danske Petroleum Gesellschaft* for Denmark, the Pacific Petroleum Company for South America, the *Deutsch-Amerikanische Petroleumgesellschaft* in Bremen, and the *Italo-Americana del Petroleo* for Italy. The majority of these companies were formed through the absorption of previously existing private firms.

The first international cartels for European sale were formed in the middle of the 90's between Russian producers, Nobel, Rothschild, and others, but soon closed agreements with the Standard Oil group, after they had all competed actively and intensively for a time. Much larger agreements were developed in 1905 between the Russian producers under the leadership of a German company and the Dutch–English producers, or the Royal Dutch–Shell concerns. Together, they established in various countries large sales companies to fight against the Standard Oil Company. In 1906 they formed the European Petroleum Union G.m.b.H. For a time certain independent American producers also participated. The great fight with the Standard Oil group for the European market lasted only a very short time. The English first came to an understanding, then the German companies. The Standard Oil group and English-Dutch group have long had an agreement concerning the European market and very probably also concerning numerous other countries. Later agreements were made also with the third newly formed large group, the Anglo-Persian Oil Company, which acquired a complete monopoly in Australia.

The European cartels were established chiefly for illuminating oil. Gradually, however, benzine became of growing importance, and for this an agreement between the Standard Oil and Royal Dutch–Shell group was made which gave to the first company a nearly complete monopoly extending over the greater part of Europe.

The Standard Oil group is probably today the largest concern in the world. The 33 American companies in which the trust was divided in 1911 represent today an exchange value of more than

4 billion dollars, the Standard Oil Company of New Jersey having a value of 1¼ billion dollars. The concern is interested in nearly 500 companies, of which about half lie outside the United States, and one can indeed say in nearly every country of the world.

But monopoly power was possessed by this concern only in the 70's and 80's, when it controlled up to 90% of the American refineries. In European countries one hears only occasionally of its monopolistic position. Up to the World War it limited itself essentially to the domination of crude oil supplies and pipe lines, but had troubled itself little about getting the crude oil. But since the beginning of the 90's it has joined several cartels of European producers for the European market, even though in its home country its custom was to suppress competition when it became uncomfortable. Since the World War conditions in the petroleum industry, as is well known, have been much changed, and the struggle for the possession of the most important petroleum supplies has not reached even a tentative conclusion. In particular the Standard Oil Company, which earlier limited itself to American production sources, as did also the English-Dutch concern, has attempted to secure sources of supply in all parts of the world. As a consequence, there are in all probability agreements in considerable number with other large concerns, and obviously even greater is the probable number of cartel agreements by which the three great groups reserve this or that country or agree concerning prices or sales quotas. However, these are all kept secret.

In the 80's began the relations between the General Electric Company and the German Edison Company for Applied Electricity, and to its successor, the German General Electric Company (A. E. G.), as well as to the various Thomson-Houston companies in England, France, and Italy. In the year 1901 the A. E. G. concluded a community of interest agreement with the General Electric Company, whereby the latter retained the United States and Canada as its exclusive market, the A. E. G. and its affiliated companies the greater part of Europe, excluding England, France, Italy, and Spain. This was not a true cartel because the A. E. G. in many of these countries and even in Germany itself had to fight with other competitors, for instance the Siemens-Schuckert Companies and the Bergmann Electric Company. Only when agreements took place among them can one speak of monopoly. These agreements were typical of the way in which great international concerns acquire monopoly positions.

After the war there developed in 1920 a close relationship between the A. E. G. and the General Electric Company, whereby the latter took over 25 million marks in shares of the former. In 1924 there were further agreements concerning the exchange of patents and experience. There appear to be international relationships with other great concerns.

Likewise, in the field of wireless telegraphy there have been international agreements which have partaken of the character of cartels; essentially, however, they had as an object the mutual exchange and utilization of patents. The German Wireless Company has such an agreement with the Marconi Company in London, New York, and Paris, as well as with the General Electric Company and the Western Electric Company. It appears at this time that important international agreements in the electrical industry, particularly in

connection with transmission apparatus, are in process of formation.

In the 80's there came also the first international organization in an industry which has been always the leader in the field of national concentration; namely, the dynamite industry. After a few loose associations between the few factories of a small number of countries there came into existence in the years 1886 and 1887 the Nobel Dynamite Trust Company of England, which includes plants in Germany and England, as well as those in the English colonies and the *Société centrale de la dynamite* in Paris, which united the French, Swiss, Italian, and Spanish companies. Both groups agreed with one another and very probably also with the Americans concerning the allocation of world markets, particularly regarding the South American market, which was of growing importance toward the end of the 90's, and concerning the sale to other countries important for the powder industry, Mexico, Panama, and others. In spite of animosities and frequent conflicts, particularly through the entrance of outsiders, this association continued to exist up to the outbreak of the war, when the German group withdrew. How far the relationship between the English, French, and American groups continued is not known; for those companies, whose profits are due chiefly to deliveries to governments, hold their internal conditions and external relationships more secret than other enterprises.

At any rate, more recently the relations between the German dynamite and powder works (which since the war have been converted into plants for artificial silk and floor covering), the English dynamite trust, and the leading American company, the Du Pont Company, have been revived, in that the two Anglo-Saxon groups have taken participation in the German enterprises which later is to be mutual. There has also been an agreement as to the exchange of patents and technical experience. Probably a cartel agreement concerning markets stands in the offing. Even more recently a change has taken place, in that the chief company in the powder industry, the *Köln-Rottweiler A. G.* with its subsidiaries, has entered into a community of interest agreement with the chief company of the dynamite group, the *Hamburger Dynamit A. G., vormals Nobel.*[10]

We have now come with the discussion of the powder and artificial silk concerns to a field in which the formation of international concerns started later than in those above mentioned, but which will probably exceed them in importance; namely, the heavy chemicals.

While in the petroleum industry, through the elimination of the German interests in Roumania, Turkey, Poland, and elsewhere, German influence is practically excluded, and the control of petroleum lies today in Anglo-Saxon hands, such an outcome was impossible in the heavy chemical industry, in spite of the seizure of many German patents. But doubtless foreign countries seek here, aided by the lack of capital in Germany, to acquire a larger influence than they had been able to secure before the war. We cannot here picture the

[10] The latest important event in this field is the absorption of the whole Köln-Rottweiler-Dynamit concern and other large dyestuffs industries by the great chemicals "trust." Evidently this has been the example followed in Great Britain in the combination of the great companies Brunner, Mond and Company, Nobel Industries, United Alkali Company, and the British Dyestuffs Corporation, to form the Imperial Chemical Industries, Limited.

many-sided contractual and financial relationship which before and also since the war have characterized the great German chemical concerns. We may only point to the fact that the previous limitations of the chief production fields have been thrown overboard.

This was already true of artificial fertilizers, likewise of the electro-chemical industry, where the electro-technical and chemical concerns came to agreement, even more with artificial silk, where rising concerns from the textile, powder, and heavy chemical industries have formed agreements. And in the greatest degree this is the case with the production of motor spirits, in which the German chemical industry is in negotiation with the largest petroleum concerns, and where probably larger and more comprehensive international capitalistic engagements are contemplated than have hitherto been exhibited. Whether the German business men are in a condition to offer opposition, considering the political and financial predominance of foreign countries, can be doubted after their experience in other fields, since they cannot count upon sufficient support from the German press, from the German Government, from their own parties, or from public opinion, in so far as such may be said to exist in Germany. At any rate, international agreements of a monopolistic nature, particularly patent utilization agreements, as well as those for the assurance of supplies of important raw materials, play a very large part in these negotiations. So we see that international cartels appear in various guises, from those in unimportant industries appealing to a small circle of purchasers up to those which are closely bound with broad questions of political power. Under such circumstances one must limit himself to most general observations in any attempt to draw conclusions concerning international cartels.

V. Conclusions on International Cartels

If it is correct to assert that the first cartels in any branch of industry are "children of need," it is even more true of international cartels. As a rule their formation is preceded by intensive competitive warfare, and as a rule first efforts at combination meet with many difficulties. Variations in laws and legislation contribute not a little to this difficulty, and facilitate the most rapid splitting up of such associations or the withdrawal of single enterprises or whole national groups. Cartels which do not comprise associations of several different nationalities, but are based upon agreements between comparatively few undertakings, for instance, in new branches of industry, and in the utilization of specific patents under license, are formed much more easily and tend to have longer existence. The first international cartels in most branches have been of short duration. The great heavy industries, especially the already highly concentrated and nationally organized heavy industries, and small specialty industries with few plants, are best suited for international cartel formation.

In a judgment of international cartels, few generalizations can be made, first, because of the insufficiency of available factual material, and again because the conditions in the various countries tend to vary widely. From the standpoint of the most rational world division of labor, one would condemn the pure territorial cartel, for example, because it often tends to keep alive expensively operating domestic industries and so prevent ultimate price reduction.

But these cartels considered not alone, but in connection with the generally prevailing protective principles operative today, assume a quite different aspect. Then they can serve to prevent dumping in countries represented in the cartel and under circumstances also in the third countries. Thereby they check further demands for protective tariffs. The prevention of dumping is above all in the interest of domestic consumers, who, as I asserted 25 years ago, are first harmed by the cheaper export of raw and semimanufactured materials.

The connection between protective tariffs and national combinations is already a much discussed problem. But the connection in the case of international cartels is much more complicated. Generally the same principles apply to international cartels as to national. They may come into existence either under free trade or under protection. For dumping, the chief purpose of international agreements in industry, is possible also in free trade. Under a protective tariff regime it is much more frequent because then the domestic prices are customarily raised above production costs and world market prices. The tariff-protected country can more easily export at lower prices, but in such a country also increase of imports is easily possible whenever prices, through domestic cartels, are shoved above the world market price plus the tariff. There comes here and there the absurd relationship between two countries in which each country dumps the same wares on the other, as has been the case not only between European countries, but even, in spite of the high freight costs, between Germany and America occasionally. In such cases, when political tariff measures cannot be taken, a cartel is the available remedy.

A chief impulse to international cartels is the frequent change of tariff policy, for it is one of the most important purposes of cartels generally—and so also of international cartels—to bring about a greater stability in the economic conditions of industry.[11] International cartels, particularly in their most frequent form, territorial cartels, also aim to remedy the disturbance of an industry by the change of commercio-political measures, and eventually to eliminate it. On the other hand, little is to be observed which would show a greater stability of prices in the world market due to international cartels. Accurate data are lacking.

But on the other hand, the dangers of international cartels which lie in the strengthening of domestic monopolistic conditions cannot be overlooked. The regulation of an industry through international agreements is often more unscrupulous than with national agreements, although their existence is less secure. The danger is true that domestic cartels keep alive inefficient enterprises so that the necessary selective processes are hindered, but it exists in no smaller measure that international cartels may keep whole branches of business enterprise alive. An economically reasonable division of labor among countries may be hindered. But again that is a danger of the protective system itself.

Whether the protective tariff, in that it closes the domestic market and increases the need for export and for competition on the world market, facilitates or makes more difficult the formation of international cartels, cannot be stated positively. However, it appears that the protective tariff increases the demand for cartels, particularly in unfavorable times. In general, the same thing holds true of international as of

[11] The Copper Export Trading Company, mentioned above, is formed especially for this purpose.

national cartels. After a time of intensive competitive warfare, international cartels are sought for in order to overcome the unfavorable economic situation of the particular branch of industry in all of the participating plants. So one may conclude that the protective tariff in itself does not encourage international cartels, but resulting increased export competition, and the general overproduction leading to depression may further international cartels.

Vice versa, one may assume to a certain degree that international cartels make protective tariffs superfluous, because a territorial cartel, which reserves to the contractual parties domestic markets, works out much more effectively than a tariff, from the view-point of the degree of exclusion of foreign goods, though not from the view-point of duration of operation. International cartels are much too temporary and their organizations too little supported by law. Furthermore, it is to be noticed that when not dealing with a world cartel, the assurance of exclusion extends only to the enterprises or the cartels of the contracting states, and therefore is seldom quite general. No country would today without further consideration renounce protective tariffs as an important political means in its endeavors to achieve national self-sufficiency.

In general, one may set down certain causal connections. Protective tariffs and domestic cartels lead to international dumping. Dumping leads to international territorial cartels. International cartels, however, lead to dumping on third markets. That leads to further increase of protective tariff tendencies in these, together with the development of new outsiders to contribute to a great world overproduction, as is today to be noticed in so many fields. Through this the nationalistic tendencies are increased. Here again, however, help is to be secured only through international agreement as to limitation of production. But these are too difficult to bring into existence, and since production limitations in all participating lands must be undertaken simultaneously, as a rule world allocation is not undertaken. In this respect also little is to be expected from international cartels but more from international concerns. But it will be a long time before an economic league of nations takes up also this question, brings about compromise of the economic interests, and one country renounces claim to that.

As one reviews all of these questions, he must take into acount, in addition to the international cartels, the international concerns. They have arisen, like the international cartels, under the influence of protective tariffs, which have caused large undertakings to establish branches in foreign countries as their own subsidiaries; thus have the great international concerns become of such great importance. It is obviously not to be asserted that such concerns would not occur under free trade. The international combinations of transport enterprises, which belong to the oldest of international concerns, are proof to the contrary. While with general free trade many great enterprises would have been satisfied to produce in a single country, they are now forced to construct their own plants everywhere. That this contributes nothing to a rational division of labor is certain. Nevertheless, international agreements are thereby fostered.

The question as to how a country can guard itself from exploitation through these international concerns is one of the most difficult of external eco-

nomic policy. Most effective, but admittedly the most ponderous, appears an import monopoly which is organized in close connection with domestic consumers and trade. Such a combination of the total demand of a country would be a factor with which the greatest monopolies in the world would be compelled to reckon. Since, as mentioned above, no individual concern has a real world monopoly, it is possible for a country which controls the total importation to be usually in a position to play one concern against another. A further discussion of this problem goes beyond the limits of this article.

Before the World War international cartels were considered purely from economic points of view. One viewed them, on the one hand, as an elimination of the often uneconomic competition and as an aid to an industry which was in bad straits, but, on the other hand, deplored the possibility of price increases, of which the national cartels on the basis of their agreements with foreign countries often made unscrupulous use. In general, however, one engaged himself with the international concerns; with the world petroleum, with the penetration of the American tobacco trust into Germany, England, and other countries; with the German potash monopoly; with the ever closer connection between the large undertakings in the German dye industry and their technical superiority; and with certain other concerns. After the World War the question of international cartels and concerns became for the first time a political problem. They began to be regarded in an essentially different light. If one feared them perhaps more on economic grounds, so one strives for them today, generally speaking, on political grounds. They are to help in smoothing over the economic difficulties created or intensified by the war or in mitigating unwholesome conditions in individual countries and the world.

Numerous business leaders of various countries have recommended international cartels as a means of helping the present difficulties of the economic world. The cartel office of the Imperial Union of German Industry has discussed several times the question of international cartels and has established a subcommittee for them. The International Chamber of Commerce in Brussels has also included the question of international cartels in its working program.

At any rate, an intensive investigation and supervision of international cartels and concerns is desired, preferably on an international basis. At a meeting of the Parliamentary Union in October, 1925, the Norwegian representative, Jon Sunby, proposed that the problem of international cartels and concerns be handled by the Inter-Parliamentary Union, functioning through a standing committee established for the purpose.[12]

In the report of the Royal Commission on Food Prices in 1925, it is further stated "that the British Government should take the initiative in the establishment of a permanent economic commission in the League of Nations, whose duty it would be to investigate the effectiveness of international combinations which deal with trade or the transportation of food stuffs, as well as to propose measures for their control."

The initiation and the encouragement of international cartels today are political measures, and although the demand

[12] In the report of the Bureau of Corporations on Combinations in American Export Trade (1916), mention is made of international concerns.

for such combinations as a rule comes from businesses which through the war and through other political regulations have been seriously disturbed, they are considered by politicians as one of the most important means of overcoming these economic injuries. And so I believe that the international cartel movement still has a great future, that once more the power which was meant for evil has created good and has been an impulse towards progress, even against the will of the participants. How far international cartels and international concerns are the predecessors and are preparing the way for customs agreements, or to what extent they operate towards tearing down tariff barriers, cannot, of course, be stated with any assurance.

MANAGEMENT RESEARCH METHODS AND QUALIFICATIONS

By W. J. DONALD

TWENTY years' progress in management owes much to science. Scientific methods of finding the solution of management problems have brought light to many a dark corner or narrow and tortuous alley.

It is easy to understand how scientific method made its first large contributions to the field of production. There the engineer has been a power for decades. For a long time, to be sure, he functioned as an advisor, first largely as a consulting engineer, and later more and more as a full-time member of the staff of a company. Of recent years a rapidly increasing percentage of line executives in factories, railroads and public utilities have been drawn from the engineering profession.

It is popularly believed that electrical engineers are better trained than others for the electrical manufacturing business, for the operation of electrically operated railroads, and for the operation of power plants; that mechanical engineers are better trained for the operation of industries in which machinery plays a large part, and that similarly chemists and civil engineers are especially well equipped for certain classes of production in which their respective types of knowledge are particularly helpful.

While acknowledging the value of a grasp of particular fields of knowledge, many are thoroughly convinced that it is not so much a knowledge of mechanical, electrical, or civil engineering or chemistry which has brought this type of trained man—the engineer—into his own in the production side of industry. Engineers won their present place in corporate organization chiefly because they had acquired a technique of investigation which is essential to modern manufacturing and utility operation. The processes of analysis which are applicable in engineering or in chemistry are fundamentally alike for all. These processes are the discovery and verification of facts, scientific methods of analysis of facts, and the discovery and proving of relations of cause and effect. The devising of solutions of problems thus analyzed, experimentation with devices to meet the situation under investigation, and the measurement of results of experiment are the closing chapters in the application of those scientific methods which sound engineering training provides.

Not every engineer, so-called, has this equipment. It is possible for men to acquire engineering degrees who have no grasp of those research methods without which no education can be said to have provided a scientific equipment. Mere mechanical lore never made a man a scientist. Nor is knowledge of formulas sufficient. In college days many engineering students debate whether it was necessary to learn how a formula is derived or why it is true. Some think it sufficient figuratively to carry the formulas on their cuffs. How far such men get in the practical world depends, of course, on how often they meet recognizable problems for which

their ready-made formulas will apply. What they do on meeting new problems would itself make an interesting topic for scientific investigation. Probably most of them sink to the level of skilled workmen or turn their energies into channels where a providence-provided personality makes up for lack of equipment in scientific method.

I

Industry today makes vast demands on the man equipped with scientific methods of approach to the solution of problems. There are more variables today in any production situation, and the solution of problems through the isolation of particular factors presents greater difficulty today than ever before. "Hunch" methods of appraising a situation are utterly inadequate for the needs of most companies. It takes more than "common sense" to determine whether the installation of certain conveying machinery combined with an incentive plan complicated by labor organization, may be desirable at present basic wage rates, affected as everything may be by apprentice training, the trend in labor legislation, immigration restriction, the possibilities of increasing foreign markets, the invention of new machinery, the trend in capital costs, and so on, and so on.

And there is more at stake—in dollars, reputations, and human welfare. Even if the largest companies made costly mistakes in the nineties or even later, their bankruptcy did not start even a good-sized ripple, let alone a financial panic or an industrial crisis; but let one of the larger automobile companies design a new model in which there is defect enough to prejudice the buying public and the sequel is a litter of damaged reputations, executive job-hunters, uncomfortable visits to the bankers, stormy stockholders' meetings, labor out of work, a heavy turnover of salesmen and agents, and unfavorable budget comparisons for every company that supplies raw materials, parts or accessories, and probably a general disturbance in the price-lists of the automotive world.

The purely technical engineering side of production has no longer a monopoly on the need for scientific methods of research. Probably it never did have, but now we know it has not. There is scarcely need to recount relations of cause and effect which bear on the whole situation. While there are companies which are satisfied to apply to labor symptoms a gloved hand where a mailed fist formerly reigned, there are others whose investigations get to the roots of problems and effect changes of policy and practice as regards benefit systems, pensions, wage plans and rates, and everything else affecting the human factor in production. Some are willing to use selective tests which others in only partially similar situations have used with supposed success. Others devise their own tests for particular circumstances and test their validity against performance. Some companies adopt ready-made wage plans without analysis of their applicability and without measuring their effectiveness, and their executives are loud in their claims of achievement which they might or might not be able to prove. Not infrequently without analysis the same plan is applied to all workers, even though in dissimilar jobs, and to jobs in entirely different lines of industry. Some companies adopt ready-made instructional material for training apprentices without analysis of the job difficulties of the particular industry or company.

In other words, the need for scien-

tific analysis arises from every corner of the whole production problem—management as well as engineering in the limited sense of that much abused term.

Hence it is that the man trained in scientific method has assumed a position of leadership in the whole production world. The really competent production executive today must have such a grasp of management research methods that he can carry on his own investigations, or at least can sufficiently interpret and appraise the soundness of recommendations of his associates.

II

Production management has thus become or at least is becoming a profession in which the man equipped with scientific methods of investigation—usually the engineer or chemist—is in the saddle.

While production has had the bulk of scientific attention, yet problems of marketing, office management, finance, and management organization are being subjected to similar scrutiny. In some quarters scientific methods have been applied to these fields for years or decades. In many quarters production received first attention, and the contagion has spread throughout the company or has been forced on divisions which were otherwise immune.

The engineer, the accountant, the actuary, and the economist are at work in every department of business and every phase of management. To put it in more generic terms, the techniques of the historian and the statistician which are the fundamentals of every scientific investigator have been put to work in the cause of better management. All of management, having thus risen somewhat out of the "hunch" stage, is thus becoming a profession.

What constitutes a profession? Henry S. Dennison, president of the Dennison Manufacturing Company, and Joseph H. Willitts, Professor of Industry, University of Pennsylvania, have drawn up five criteria as follows:

1. A profession is an occupation which requires intellectual training as contrasted with mechanical skill.
2. A profession employs the fruits of science; uses the scientific method and maintains an experimental attitude toward information.
3. The professed knowledge is used by its applicant to the service of others, usually in a manner governed by a code of ethics.
4. The amount of financial return is not the chief measure of success.
5. The professions are given public and often legal recognition.

These criteria are of two types. The last three bear on the professional man's relations with others in the profession, to the client, and to the public. The first two have to do with his equipment of scientific methods of investigation. Note that it would be hard to write into these criteria any idea that mere knowledge of facts is a part of professional equipment. Rather it is "the use of scientific method," and the "experimental attitude toward information" which are emphasized. Intellectual training consists of the attainment of these—not the mere acquisition of information.

III

Valuable as information may be, its acquisition does not constitute scientific training or make a man a scientist.

This leads to the most important part of collegiate training in management. It has not been unusual for even some of our best known professors of management to emphasize subject matter to be covered and the sequence of courses—the main idea being the ac-

quisition of knowledge about business management or information about management methods. Too often there is no evidence of an understanding of the true purpose of education—intellectual training in the sense of a technique of investigation.

The amount of information about management which college students will obtain in a two- three- or four-year course is relatively unimportant compared with what will be acquired in the first few years of business life. In any case its value is ephemeral, for the methods of management are developing and changing so rapidly that what is known today has become obsolete in a surprisingly short time. Furthermore, the text-book and collateral reading material used in class is too often already several years old. One need only recall the rapid development of budgeting methods or the radical change in attitude toward methods of employee training to illustrate this point.

What is of permanent value to the student is the acquisition of technique of investigation as applied to management —the impulse to verify facts, to challenge mere gossip and impressions, the power to use statistical method and to handle historical evidence.

This is the content which is common to the whole field of management—sales, production and finance—and it is from this type of training that management is going to realize its greatest development.

To these ends, the whole university curriculum may contribute. The classics can be defended not so much by the threadbare argument that one may thus acquire a knowledge of the roots of language and an appreciation of the literature of the centuries, as because they contribute to the technique of getting at the truth. The value of mathematics, modern languages, the physical and the social sciences, lies in the same direction. This is what we have sometimes called mental discipline.

Our collegiate schools of business are, of course, nearly all offering courses in statistical method. There is none that is giving specific instruction in the treatment of historical evidence—yet historical evidence is probably even more abused than statistics when applied in the management questions. The study of statistical method is fundamental for the future work of the investigator of management problems. But most of our colleges can go still further. Accounting can be taught universally, as it is being taught in some institutions, not as an equipment for keeping a set of books, but as a technique of management research. Everywhere through instruction in management there should be training through actual practice in the process of investigation. It is a common complaint that some universities advance their staff members on the basis of the results of their researches. The policy has been criticized on the ground that the professor who is a good teacher is equally as valuable as the good investigator. Many sympathize with this point of view. As a matter of fact, the chief objective of education —intellectual training as we have defined it—cannot be achieved by men who lack the spirit and technique of the scientist, and no one can be a good teacher who cannot and is not demonstrating his ability to do research. Too often what is referred to as good teaching is nothing more than interesting lecturing, combined with a good technique for compelling students to acquire information which they spill out on schedule on the inevitable examination paper.

Probably professorial advancement

could be placed on a middle ground by being given to those who, with the spirit of and capacity for research, at the same time are able to and do develop in their students the same spirit and capacity.

Now practice in scientific methods of management research is not to be acquired with entire satisfaction in an artificial or miniature world. It calls for a vast extension of cooperative business research. The faculty and the students must have real problems to investigate if the technique of investigation is to be imparted so successfully that it becomes the permanent equipment of the student. In this extension business executives have their part to play, and they have no real claim to a right to criticize until the way has been made reasonably smooth for our educational institutions.

There is already a vast literature on management, much of which has a great, even though temporary, value. It is growing by leaps and bounds, thanks to the activities of societies and the efforts of the publishers of journals and business books. Let us hope that the process may go on unabated. It serves to meet a pressing need. Executives meet to exchange experiences on management methods (not research methods) used to meet specific problems and share opinions regarding the merits of their methods. Let that, too, continue unabated. The inclination to investigate a company's problems must be preceded by an awareness that problems exist, and the knowledge that other companies use different methods is likely to stir executives into action.

So, too, there are histories and biographies unending, so much so that one almost has to make history in order to find a worthy topic for investigation. But of literature on the treatment of historical evidence and the verification and interpretation of evidence there is a dearth. Management suffers from the same lack.

IV

A beginning has, of course, been made. Management societies have published a few papers which merit inclusion in a list of documents on management research methods. Despite a comparative lack of appreciation, the publishers have also offered us a few books of similar importance.

There is a considerable number of books on statistical method which are useful to the investigator of management problems, but their value is considerably reduced by the fact that examples of the application of statistical method have little or no relation to management. And as for literature on methods of treating historical evidence in the field of management—find it if you can.

It is easy to agree that there is ample room for a body of literature of scientific methods of investigating management problems.

What have we a right to expect of the future? There is set down below a few of the topics on which papers of merit would be welcomed by the business world. And for the sake of clarity, there is set off against each, topics which do not belong in the field of research methods. There is a clear line of distinction between management research, management methods, and management research methods. It is the development of the latter and the ever widening number of competent users which will contribute most to the cause of management either as a movement, a body of knowledge, or a profession. Without it there will be a dearth of sound management research

and much less than we need of effective management methods.

These documents do not, of course, include numerous papers in which are presented management methods which have been adopted after scientific investigation or conclusions regarding results achieved which are based on careful scientific measurement and appraisal. Such papers are extremely valuable in suggesting lines of investigation for those whose problems have not been satisfactorily solved, but their value presumes that those to whom they open up a line of investigation are equipped to study the problem scientifically, and will not merely adopt a management method ready made without, in addition, ability to measure the results achieved. Unfortunately, presumption has altogether too little validity.

Some possible topics are as follows:

1. The method of determining what incentive plan would best suit a particular class of employees; *not* the art of installing an incentive plan.
2. The method of measuring the results of the installation of an incentive plan; *not* experience with or the results from installing it.
3. The formula involved in determining what the financial liabilities under a pension will be; *not* the actual financial liabilities under a pension plan or the experience of various companies.
4. The method of determining the best method of posting; *not* the best way to post reports.
5. The method of determining and testing a test for selecting employees; *not* experience with tests for employees.
6. The formula for going about a classification and rating of executives; *not* experience with a plan for classifying and rating executives.
7. The technique of determining where to locate a plant; *not* conclusions as to where to locate a plant.
8. The technique of making a job analysis and of standardizing salaries and wages; *not* a classification of standard jobs and a salary or wage standardization plan.
9. The formulas for significant ratios; *not* actual operating or balance-sheet ratios.
10. The method of determining economical quantities; *not* the economical quantities for production.
11. The method of determining the instructional material needed; *not* the proper instructional material for a company's salesmen.
12. The technique of market analysis; *not* conclusions regarding markets for a commodity.

What can be said of the other three criteria? They have to do with the ethics of a profession. Frankly, the situation looks more than usually complicated, though probably not more so than the circumstances surrounding the birth of the medical, legal, or engineering profession. There are, of course, the relations of the consultant with the client, with his staff, with each other and toward the public—the consumer. Executives of companies who hold advisory positions have delicate problems of relations with outside consultants, with their own subordinates, with line executives high and low, and even their obligations to the public and to their own selves. Line executives who have the spirit of the scientist have their relations with other line executives, with advisors, with their superiors, and with their subordinates, including the workers.

What is the ethical content common to all of these? We find in them only three principles—namely:

1. Allegiance to scientifically determined truth;
2. Willingness to share the knowledge of scientific methods of investigation with others; and
3. Willingness to reward with recognition competent users of scientific research methods and especially those who have contributed to the body of knowledge of management research methods.

Nothing else will develop allegiance

to scientifically determined truth as will following the road down which it leads. It pays in satisfaction and in dollars. At least a considerable number of us will agree, without argument, that it does. One can lecture by the hour about the value of civic pride or civic cooperation, but none will be forthcoming until citizens get into action for the town. Moralizing about loyalty to truth will make no impression until it is practiced. Then it will need no argument or moralizing because it will have become a habit of mind.

There are still many companies which will not share their experience with others, especially competitors. By and large, they are taking a short-sighted view of matters. A competitor is never so dangerous as when he is incompetent, and especially when he does not know the facts of his company, his line of business, and business conditions generally. The company which accepts the salesman's alibis for not bringing in the orders—especially the statement that competitors are cutting prices when they are not—or which cuts prices because it does not know through its trade association that it is getting its share of a depressed market, is a menace to the trade.

Secrecy about management methods has gone out of style, and unwillingness to discuss methods with others is mostly due today to lack of confidence that the right thing has been done or to lack of time to prepare adequately a satisfactory presentation. Executives who are sure of their accomplishments are extraordinarily willing to talk about their achievements.

There is only one limitation to indiscriminate willingness to share experience with others. It lies in the danger that inadequately trained men will apply management methods to situations which they do not fit. Sharing experience with them is as likely to lead them astray as to help them. The remedy, however, lies not in secrecy but in the spread of an appreciation and knowledge of management research methods, with the aid of which a company's own problems may undergo thorough investigation along channels suggested by the experience of others. In the sharing of knowledge of the technique of management research there need be no reservations.

Indeed, this much at least is a professional obligation. In medicine, it has been a point of professional honor that all discoveries shall be shared; whoever exploits a discovery is considered a quack.

V

What peculiar reward shall be afforded competent users of scientific research methods and those who contribute to the knowledge of management research methods? Is any other than pecuniary reward necessary? To be sure, the financial rewards of scientifically trained men have been increased and will continue to increase. But there is no assurance that they will increase more rapidly than the returns of others.

There is unquestionably a need for non-financial recognition which will take the place of the satisfactions that come from official corporate status or large money returns. There have always been and we hope always will be many scientists who will choose achievement in intellectual pursuits in preference to the satisfaction that more dollars will buy. There are others who will have no choice and others who will—happily for themselves and others—just drift into intellectual achievement.

The time is ripe for some form of recognition for knowledge of and contributions to the knowledge of management research methods.

There are three main classes of persons deserving recognition:

1. Persons who have contributed to the knowledge of management research methods;
2. Persons who have done management research of such a distinguished character as to merit special reward;
3. Persons who are able to demonstrate their competency in the use of scientific methods of research as applied to management problems.

In addition, encouragement should be afforded to three other classes:

1. Persons who are in management research who cannot yet show results or demonstrate their capacity, but who should be encouraged to acquire a thorough grasp of the technique of research;
2. Persons who, while they have not been and are not engaged in management research, nevertheless appreciate and encourage it, and have occasion to pass on the results of the work of others and to convert their conclusions into executive action;
3. Juniors who, having acquired a collegiate training in management research—or its equivalent—have not yet sufficient experience and practice, and who should be encouraged to develop their capacities to the full. After all, graduation is but the "commencement" of a lifetime of education.

Progress in the development of management research methods and in the number of qualified users thereof depends on two main steps:

1. The provision of a definite channel for continuous, organized discussion of management research methods; and
2. Some definite recognition of those competent to investigate management problems scientifically.

When these two steps have been fully taken, the progress of management methods will be vastly accelerated, and our universities and colleges will be encouraged to turn out the right type of trained men who will find a large body of appreciative employers. Then management will be well on the way to becoming a profession.

THE RISE AND FALL OF FIRMS IN THE AUTOMOBILE INDUSTRY

By RALPH C. EPSTEIN

AT ANY particular moment in any branch of manufacture," wrote Alfred Marshall, "some businesses will be rising and others falling; some . . . . doubting whether to start new factories, others whether to enlarge existing factories . . . . while others, again, feeling themselves behind the age, finding by experience that the equipment and internal organization of their factories will hardly enable them to sell at current prices and make a profit, will be tending to diminish their average output, or perhaps breaking down altogether."[1]

If such is indeed the case in any trade, it will be of especial interest to inquire into the condition of commercial mortality and survival in an industry during the first few decades of its existence. The automobile industry, although stabilized in the sense of being firmly established and enjoying a steady demand for its product, is still young. As a branch of manufacture (distinguishing motor "manufacture" from the early experimental workshop stage of the decade 1890-1900), automobile production has behind it a history of barely a quarter of a century. In these 2½ decades it has made such strides as to place it not only in the forefront of American industry, but literally first among the country's manufactures, if their importance be measured by the value of their products. To analyze this amazing growth, in terms of the rise and fall of the individual firms which have played a part in it, is the purpose of this article and the one to follow.[2]

I. The Length of Life of Automobile Companies

Between 1903 and 1924, inclusive, a total of 180 companies engaged in the manufacture of automobiles. That is, the 24 companies in production at the beginning of 1903, plus the companies which entered subsequently, made a total of 180 producers who, up to and through the year 1924, had built and sold passenger cars upon a commercial scale.

This figure, in comparison with estimates often made, and with one list which has already been published, seems

[1] *Principles*, p. 414 (First Edition, 1890). Marshall adds that these are, however, "eddies on the surface of a great tide. Such eddies will always exist, and occasionally play an important part in the history of a particular trade." To characterize these incidents as mere eddies is, I think, greatly to understate their importance for purposes of general economic analysis; but this matter I shall not attempt to discuss in these articles.

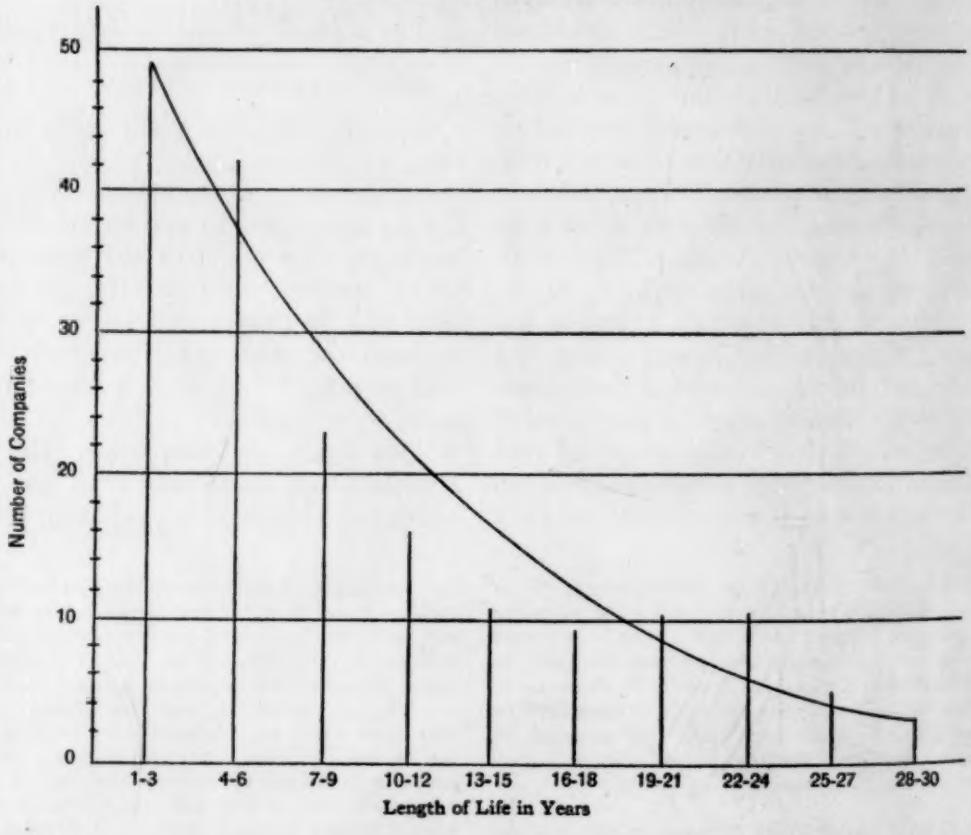
[2] I am indebted to the Directors of the National Automobile Chamber of Commerce for great aid in the compilation of the materials for this and other phases of my study of the industry. It is due entirely to the courtesy of Colonel Charles Clifton, William E. Metzger, Roy D. Chapin, J. Newton Gunn, Alfred Reeves, and to the generous cooperation of their associates, that the comprehensive data upon which any adequate study of "rise and fall" must be based were made available for economic investigation. I wish, likewise, to make acknowledgment of valuable suggestions received from Professor Edwin F. Gay, O. P. Pearson, and John C. Long.

very low.[2] I doubt, however, whether the correct number of companies which have actually engaged in automobile production over the period 1903–1924, if it could be ascertained with the utmost accuracy, would run much over 200. The count here made of 180 includes the total number of firms for which I have either actual production data, or have good reason to believe actually produced and commercially sold cars. Undoubtedly there were during these years a number of other companies, some of which probably engaged in fabricating automobiles. Most of them, however, were business units, either incorporated or otherwise, which simply existed in the minds of the men who organized them. Those which did make cars turned out only a few, often

[2] The March, 1909, issue of the magazine *Motor*, for example, contains a list of 639 firms that "engaged" in business up to that year. Similarly, O. P. Pearson, the statistician of the National Automobile Chamber of Commerce, has compiled data which suggest that even a greater number of companies than this have been organized, and has very kindly permitted me to examine the data of his researches. But, as will immediately be pointed out in our text, he has no way of knowing the extent to which many of those firms actually "engaged" in business upon a commercial scale.

Chart I

Frequency Distribution of Length of Life of 180 Passenger Car Manufacturing Firms, 1895–1924



only a sample car or two. A number were "active," in this sense, for one year only, or even for a shorter time. Any estimate which included these "paper" firms would run high indeed. To count them might throw light upon the number of aspirants to automobile manufacture; but it would hardly afford a picture of the rise and fall of actual manufacturing establishments. In calculating total entrants and exits, therefore, I have included only such firms as seem actually to have produced and sold cars in a commercial way, firms which sold cars to customers other than merely their few principal stockholders or promoters, and operated plants for more than merely two or three weeks or a month.

Of the 180 companies which, in this strict sense, engaged in passenger-car manufacturing over this 22-year period, 121 have retired from the field. Fifty-nine now remain.[4]

Of these 59, only 11 have been in business for the entire period. Some of the 59 entered only a year or two ago, while many others have been in the field for a decade or more. The average (arithmetic mean) length of life, for all 180 companies, has been 8 years. The median length of life has been 6 years.

The distribution of these companies according to the number of years they have remained in business is given in Chart I.[5]

It will be seen from this chart that 50 of the 180 companies have enjoyed a life of only 1, 2, or at most 3 years. A life of 4–6 years is found for 42 other companies; while a 6–8-year duration characterizes 26 other firms. The falling curve of Chart I indicates that

[4] As of the year 1925. These and other figures have changed slightly as the article has been put into type, but not sufficiently to warrant alteration of either the charts and tables already prepared, or the reasoning in the text itself. The figures do not include three companies which have recently entered and build only taxicabs; nor, as will appear shortly, do they include newly incorporated subsidiaries of old companies.

[5] It is doubtless advisable to define more exactly what is here meant by the terms, "length of life," "entrance," "exit." The length of a concern's life is not taken to mean its continued corporate existence under one name, but the number of years during which it or a direct successor continued to produce motor-cars constituting essentially the same line of vehicles. For example, in 1903 Thomas B. Jeffery and Company engaged in the manufacture of the "Rambler" automobile. This is counted as an entrance into the passenger-car field. About 1912, following the death of Thomas B. Jeffery, the name of the car was changed to "Jeffery," and the name of the company to The Thomas B. Jeffery Company. Then, in 1916, the Jeffery interests sold their properties to a group, headed by James J. Storrow and C. W. Nash, which had just organized the Nash Motors Company. But the Jeffery establishment was taken over as a going concern; the plant continued to operate as before; the distributing organization remained much the same. Though the Jeffery Company, as a corporate entity, completely disappeared, this is not considered as constituting an "exit" from the field of automobile manufacturing. The enterprise, an effective business unit at the time of its sale, continued in operation; its ownership merely changed hands. Thus, the Nash car and the Nash Motors Company may be regarded not as newcomers, from the point of view of the rise and fall of firms, but as lineal descendants of the Rambler car and Thomas B. Jeffery and Company. Not only was the number of concerns in the industry left unaltered by this change in ownership, but relatively little new capital was immediately invested, nor old capital withdrawn, as its direct result. There did soon occur, to be sure, an expansion of the business under the new régime, but this was financed chiefly out of earnings, and might have taken place in substantial measure anyhow.

There are in this compilation several such changes in names, either capricious, or the result of complete transfer of ownership such as in the case just sketched. In all these instances such changes are not considered to constitute either "entrances" or "exits." Combinations of existing companies have been similarly treated when the lines of cars manufactured were continued. Thus, in the case of General Motors, the Cadillac, Oldsmobile, Oakland, Buick, and Chevrolet companies are not regarded as disappearing with their absorption into the holding company, but are counted

as the length of life increases, the number of companies enjoying it steadily shrinks. Only 5 companies have remained in business for 25–27 years, and only 2 have survived a 28–30-year period.

Further details of this sort can be obtained from Chart I. Expressed in terms of certain percentages, the distribution shows the following frequencies:

28% of the total number of firms have lasted 3 years or less.
51% of the total number of firms have lasted 6 years or less.
34% of the total number of firms have lasted 10 years or more.
20% of the total number of firms have lasted 16 years or more.[6]

How, it may be asked, do these lengths of life compare with those for firms in other industries? Unfortunately there are no comprehensive figures available for other important individual trades or manufacturing pursuits; although something will be said shortly as to certain general percentages of failure which have been compiled by R. G. Dun and Company for all businesses taken together. But, even in the absence of satisfactory comparable data for other separate industries, it seems evident that the mortality in automobile manufacture is high; only 33% of the firms which actually got started at any time during this 22-year period still survive.

That there have been relatively so many automotive failures is not, however, upon second thought so surprising. One would expect the hazards to be greater in a new industry, especially one making a complex fabricated product, subject to constant change and improvement in design and construction. This recurrent necessity of making innovations both in the character of the prod-

(*Footnote 5 continued from page 159*)

as continuing in business. General Motors, now, happens actually to own the physical assets of the car-manufacturing divisions. But they are still separately operated; and are generally still regarded by the trade as individual manufacturing and marketing units. Those firms did not "fall"; they combined. But when Cartercar, Welch, Scripps-Booth, and Sheridan (other General Motors units) were discontinued by the holding company and their plants liquidated, their disappearances are then counted as "exits" from the industry in the years in which liquidation took place.

Whenever a concern has been consolidated with, or purchased by, another already existing concern, and one line of cars discontinued as a result of the consolidation, this is considered as an "exit" from the field. While in the few instances in which this has taken place, no great amount of capital may have been withdrawn, the effect has been, however, to reduce the number of producing units.

In the instance of an already established company merely adding a car to its line, but giving it a new trade name, the new "subsidiary" is not treated as a new concern, although it may be separately incorporated. Thus, for example, Essex Motors, Incorporated, building the Essex, a low-priced car produced largely in the Hudson plant and marketed as a part of the Hudson line, is not counted as a separate company. A different name was given this model primarily as a matter of marketing strategy.

It remains, in final explanation of the terms "entrance" and "exit," to mention the participation in automobile manufacture by firms already engaged in other manufacturing fields. Often these continued making sewing machines, wagons, plows, or locomotives, after entering upon the manufacture of motor vehicles. In spite of the fact that no new corporation may have been created when this occurred, this should be regarded as the "entrance" of a new automobile firm. The withdrawals of such companies from passenger production (and it is an interesting fact that most of them have withdrawn) are "exits" in the tabulation of rise and fall, although there may have been no failure of any corporate unit at all. Instances of the various sorts above mentioned do not, however, predominate among the concerns here tabulated; and except for such cases the term "entrance" means the organization and actual operation of a new concern; "exit" means failure, and, ordinarily, liquidation; "length of life" means the elapsed time between the two.

[6] Put otherwise, the median length of life is six years; the first quartile is three; the third quartile, thirteen.

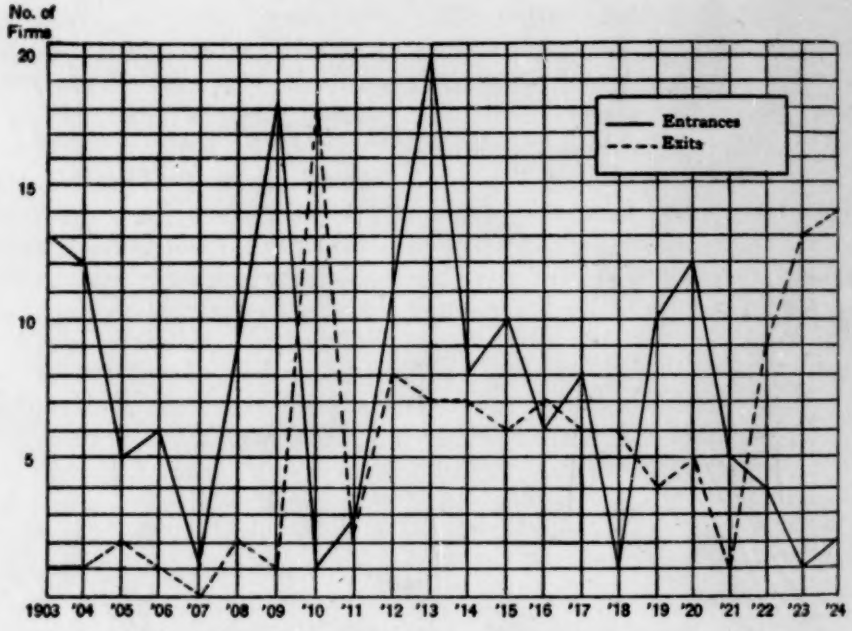
uct and in methods of manufacture, if a firm's place in the industry is to be maintained, probably serves to explain in large measure the complete disappearance of many automotive names that were once highly respected. Coupled with this imperative necessity of making alterations in the character of the product, has always existed the danger of making them too readily or too drastically. For if insufficient change of practice means stagnation, so also do frequent and complete shifts of production policy spell manufacturing and marketing confusion.

Similarly, in the automobile industry, a delicate balance had always (and still has) to be struck between a policy of making too few models or "chassis types" to satisfy the demands of the market and one of simultaneously making too many types to permit a sufficiently economical production and a satisfactory control over manufacturing processes. As in other trades, the dealer ordinarily desires a complete, or fairly complete, line. He welcomes the production of an additional model which will sell in another price-class, for then he can sell against the competition of a greater number of other makes of cars. But the experienced manufacturer knows that by the development of standard practice in plant operation, the more readily attainable through a policy of concentration upon one or two popular chassis types, he can markedly lower factory costs. Thus viewed, the greatest degree of economy in production at times seems to be incompatible with the fullest measure of success in market competition. But since a firm's net earnings are always a result (or, in mathematical language, a function) of both sales volume *and* production costs, the most profitable policy for a firm to pursue is seldom to increase sales alone, or to lower production costs alone, but always to find the proper point of balance between these two variables. This point, for any particular product at any given time, being largely a matter of guesswork, of shrewd judgment coupled with trial and error, some firms have tended towards the one pole, some towards the other. Willys-Overland throughout most of its history, Studebaker in recent years, and Buick for a considerable time, furnish examples of concerns which have attempted to meet the demand of the dealer for a comparatively large line of products. On the other hand, Ford, Dodge, and Hudson offer three admirable illustrations of firms which, over periods running from 8 to 16 years each, not only made very slight changes in design from year to year, but also leaned strongly in the direction of simplifying production during any given period by concentrating upon a relatively narrow line of products.[7] Those firms, however, which have leaned too far one way or the other in these two matters of supplying the dealer with either too large or too small a number of models, or in chang-

[7] The more recent compromise policy which Hudson initiated and several other firms have adopted —namely, that of producing a second car under another trade name at the hands of a subsidiary company—is not considered in this paper, which is concerned chiefly with the figures of rise and fall themselves. Such recent practices, however, raise some extremely interesting and significant questions of general business policy which I hope to consider at length on some future occasion. What is the proper number of models for a firm to make is not, of course, completely settled, nor would any standard which might be set up, however sound it might seem, necessarily obtain either for all companies or for all periods. The trend of the last few years seems in the direction of increasing the line. Manifestly the conditions of market competition here constantly interact with, and significantly influence, consideration of production.

ing the design and construction of cars either too drastically or insufficiently at certain intervals, have fallen by the wayside. It is not here meant to imply that errors of judgment in connection with these several policies are the only causes of business failure in this and other industries. There can be little doubt, however, that they have acted as important causes. Financial incompetence, lack of selling ability, pure administration ineptitude, all have counted here as elsewhere. But, allowing for all such individual ineptitudes in particular cases, the high general level of failures in automobile manufacture remains in large measure due to the great difficulties present in striking a proper balance between sales and manufacturing policies.

Chart II



NUMBER OF FIRMS ENTERING AND LEAVING THE PASSENGER AUTOMOBILE INDUSTRY

Year	No. of Entrances	No. of Exits	No. Firms Remaining	Year	No. of Entrances	No. of Exits	No. Firms Remaining
1902	.....	.....	12	1914	8	7	71
1903	13	1	24	1915	10	6	75
1904	12	1	35	1916	6	7	74
1905	5	2	38	1917	8	6	76
1906	6	1	43	1918	1	6	71
1907	1	0	44	1919	10	4	77
1908	10	2	52	1920	12	5	84
1909	18	1	69	1921	5	1	88
1910	1	18	52	1922	4	9	83
1911	3	2	53	1923	1	13	71
1912	12	8	57	1924	2	14	59
1913	20	7	70				

II. Failures Year by Year

So much as to the causes underlying certain broad factors in automotive failures throughout the period 1903–1924 in general. What, now, of the specific course of failures from year to year? Both in absolute number and in the proportion of failures, has there been any marked variation?

A glance at Chart II will show that the answer is distinctly in the affirmative. The curves of this chart show the absolute number of entrances into and exits from the industry during each year, 1903–1924. The table below the chart gives the supporting data, and, in addition, the number of firms left in business at the end of each year or at the very beginning of the year following. The solid curve represents entrances; the broken one, exits.

In tracing the relation between these two curves, it will be noted that they seldom rise or fall together in the same year. That is, they correlate inversely. A year in which many firms entered is, as might be expected, seldom a year in which many failures occurred. Conversely, in those years marked by a large number of failures, relatively few concerns essayed to enter the industry. For example, in 1909, with 18 entrances, there is but 1 failure, while in 1910, with 18 failures, there is only 1 entrance. In 1924 also, though there are 14 exits, there is only 1 entrance.

This inverse correlation is, as the chart indicates, far from perfect. But in the main the figures justify the not startling conclusion that new firms choose "good years" in which to enter business; while "bad years" dissuade those with intentions of doing so. Certainly the 18 failures of 1910 served to cast an effectual damper on entrances in 1910–1911; and seemingly again, the large casualties of 1922–1924 discouraged attempts to start in those years. The great number of companies which entered the field in 1912–1913 is probably due to the launching of many plans which were postponed in 1910–1911. What caused the great number of entrances in the period of 1908–1909 itself is difficult to say. In some measure it may represent a recovery from the poor conditions of general business in 1907–1908; in some measure a mere rushing of entrepreneurs into the field, confident that the automobile had definitely "arrived" and that quick profits were readily obtainable. The number of failures a year later (1910) chanced to be identical with the number of entrances in 1909.

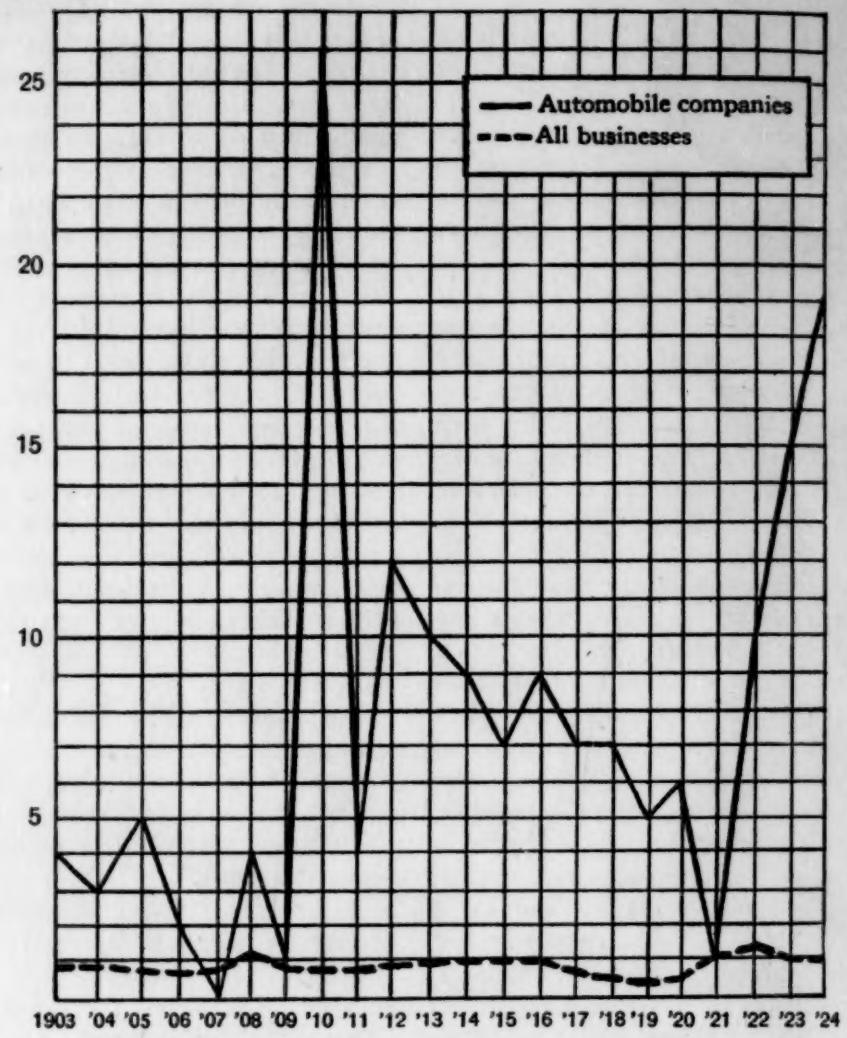
Turn now to Chart III, which shows not the absolute number but the proportion of companies which failed annually.[8] Here, as in Chart II, the data plotted are presented in tabular form below the chart.

Again, the great fluctuation in the percentage of automobile failures is apparent. Sometimes as low at 2%, 1%, or even zero, the solid line of Chart III rises several times above 10%, and in three of the years shown, to 15% or more. To some extent, as in 1922–1924, this is the result of the fluctuation of general business; but in large measure, it is due to developments in the automobile industry itself, developments which will be discussed shortly.

These percentages of failure, it should now be remarked, are notably

[8] The number of automotive exits in each year is here expressed as a percentage of the firms in business at the beginning of the year (left at the close of the year preceding) plus those which entered during the year in question. Thus the figures to which exits are here related are somewhat larger than the figures for "number of firms remaining at end of year" given in Chart II.

Chart III



FAILURES IN PASSENGER AUTOMOBILE MANUFACTURING COMPARED WITH FAILURES IN GENERAL BUSINESS

PERCENTAGE OF FAILURES IN PASSENGER AUTOMOBILE MANUFACTURING						PERCENTAGE OF FAILURES IN ALL MANUFACTURING, TRADING AND COMMERCIAL PURSUITS					
Year	Per Cent	Year	Per Cent	Year	Per Cent	Year	Per Cent	Year	Per Cent	Year	Per Cent
1903	4	1911	4	1919	5	1903	0.9	1911	0.8	1919	0.4
1904	3	1912	12	1920	6	1904	0.9	1912	0.9	1920	0.5
1905	5	1913	10	1921	1	1905	0.8	1913	0.9	1921	1.0
1906	2	1914	9	1922	10	1906	0.7	1914	1.0	1922	1.2
1907	0	1915	7	1923	15	1907	0.8	1915	1.0	1923	1.0
1908	4	1916	9	1924	19	1908	1.1	1916	1.0	1924	1.0
1909	1	1917	7	.....	.....	1909	0.8	1917	0.8	.....	.....
1910	26	1918	7	.....	.....	1910	0.8	1918	0.6	.....	.....

greater than those for business failure in general. Although, as previously stated, there exist to my knowledge no comprehensive figures for other individual industries, there are available certain annual figures of general business mortality; first, for all business concerns in the United States, second, for all manufacturing firms in the United States in certain years. R. G. Dun and Company present[9] a record of insolvencies running over a period of 60 years, and calculate the proportions for the period 1903–1924 for all concerns engaged in manufacturing, trading, and commercial pursuits. These figures I have plotted in Chart III also; this broken line, running almost straight across the chart, stands at a level that is surprisingly low when compared with that for automobile manufacture. In no year did general business failures much exceed 1% of all concerns engaged in manufacturing, trading, and other commercial pursuits.

For manufacturing alone, Dun and Company do not give percentage figures, but they list the absolute number of failures in all manufacturing fields for the years 1910–1925. Such of these figures as I can relate to the total number of establishments given since 1910 in the *Census of Manufactures* are as shown in the table below.[10]

Year	Number Establishments	Number Failures	Percentage
1914	275,791	5,116	1.9
1919	290,105	3,827	1.3
1921	196,267	4,495	2.2

These figures of approximately 2%, 1%, and 2% are to be compared with figures for automobile manufacturing, for the same years, of 9%, 5%, and 1%. The last automobile manufacturing figure (1% for 1921), however, was abnormally low; as Chart III indicates, it rose to 10 times as much the year following, and still higher the year after that.

III. Causes of Changing Rates of Failure

How, now, account for the great fluctuations in the year-to-year percentage of failures over the period indicated by Chart III? For the slight fall in the percentage of failures from 1903 to 1907, it may merely be suggested that the relatively small number of companies in the field, together with an unusual prosperity enjoyed by the new industry in 1903,[11] made the conditions of existence fairly easy during those years. But the succeeding period, 1908–1912, offers a fruitful field for analysis. Ignoring the 26% peak in the single year 1910, for which special factors account,[12] a question first arises concerning the marked general increase in the percentage of exits during the years 1907–1912.

This rise seems to be due both to

[9] In *Dun's Review*, January 9, 1926.

[10] It will be recalled that this census, from 1899–1919, was issued only quinquennially; not biennially as at present.

[11] The Olds Motor Works notably, making a $650 car, the famous "Curved-dash" Oldsmobile, had just convinced several thousand purchasers that the horseless carriage was a practicable road vehicle, and in 1904, largely as a result of the Olds success, a greatly increased number of purchasers rushed to buy (see Chart IV presented in the text on the next page).

[12] The near failure of the General Motors Corporation in that year, following a too great expansion of production in 1909 and 1910, led to serious difficulties of a cyclical character (loosely, "cyclical" in the special sense of a particular industry's own "business cycle") on the part of most producers in 1910 and 1911. In addition, the demand for high-priced cars in those years underwent a decline, which will be discussed below.

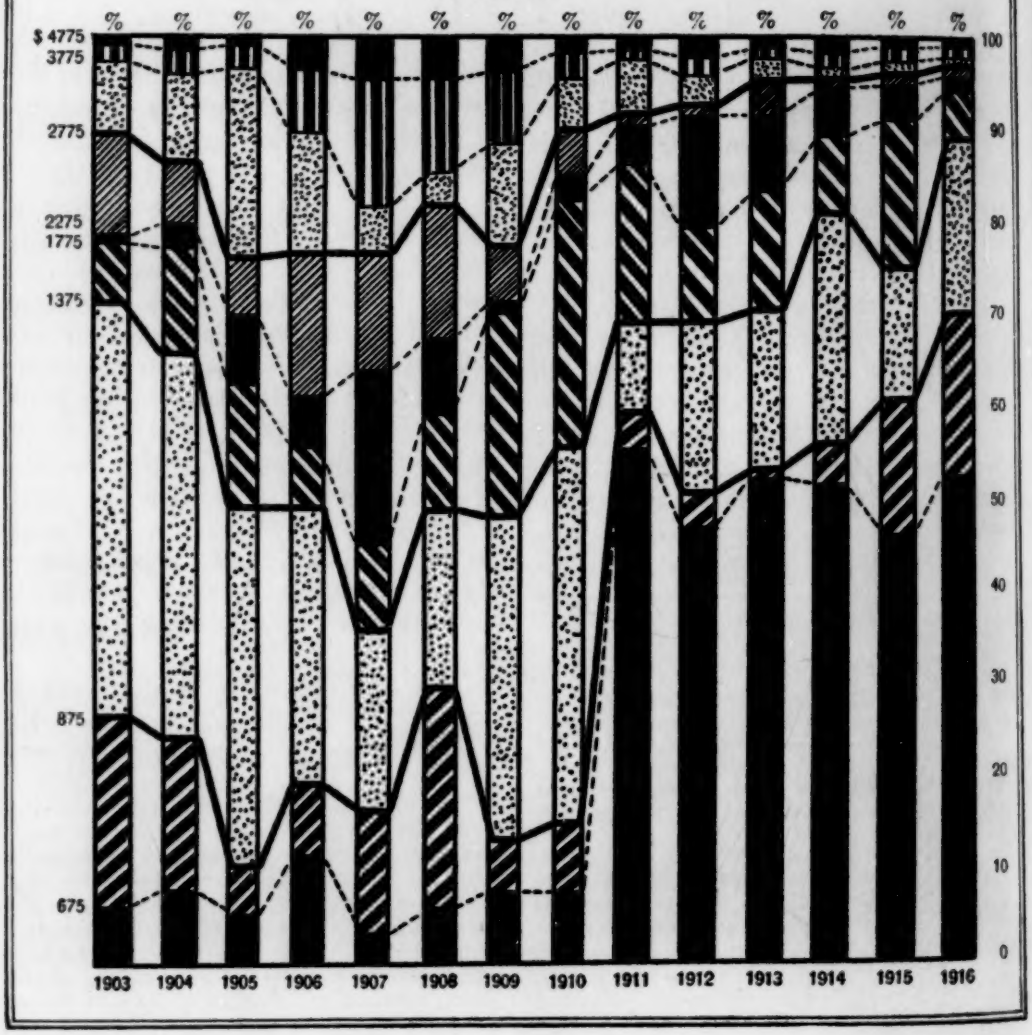
rapidly changing techniques of design and production, and to changes in market demand as between high-priced cars and low-priced cars. Chart IV shows the shifts in sales which took place as between the several price-classes of cars over the period 1903-1916. This chart, prepared from a practically complete enumeration of the production figures for all companies which engaged in manufacture,[23] indicates the astounding increase in the

[23] Space here does not permit a full explanation of the manner in which the figures entering into Chart IV were compiled. A complete statistical study of the growth of the market, from which these data are taken, will appear separately at a later date. It will suffice here to state that where the production of a particular company in any year consisted of two or more models and the proportion in each could not be ascertained, the output was distributed equally among the several models sold, that is, no weights were employed within the productions of single companies.

Chart IV

Factory Sales of Passenger Automobiles in Various Price-Classes

1903-1916



proportion of low-priced and medium-priced sales which took place after 1907. But just as this "popularization" of the automobile began, and buyers in the lower ranges of the income scale had to be sold if the industry was to enjoy any great degree of expansion, there occurred technical changes within the industry itself.

Between 1907–1910, single- and two-cylinder cars were practically abandoned. Four-cylinder and even six-cylinder machines were made, and many manufacturers found them more difficult to build. The transition to higher powers and weights involved the necessity of redesigning not only the engine, but often also the axles, transmission, and the rest of the running gear. If, for example, a firm attempted to utilize on a heavier model the same rear axle it had employed on a lighter, the results were often disastrous. The car would come to have a bad reputation; it was known to consumers and especially to dealers, as a "lemon," or perhaps, at best, as a good car with poor rear axle shafts or axle housing. If any great quantity of such cars had been shipped, "making good" in a market sense often involved the prompt replacement, free of charge, of all parts already in consumers' hands. Unless this was done, both dealer morale and consumer demand fell off.

On the other hand, extensive redesigning of models meant incurring heavy expenses for new dies, jigs, templets, or even new machinery. It might also involve losses on certain items of inventory. Nowhere in the industrial field was the attainment of a nice balance between means and ends more necessary or more difficult than in automobile manufacture with its highly unstable conditions. What to make and how to make it, when to change and how much to change, to which class of consumer the product was to go, and how to get it there—when to be bold and when to be conservative—these were indeed anxious problems calling for manufacturing, sales, and financial ability of the highest caliber. And, as in all business enterprise, chance has played a part. It is easy now to see the revolution in the demand for cars of several price-classes which occurred after about 1907; but the manufacturer who obstinately stuck to their manufacture in 1919 had no chart to warn him. In retrospect, the lack of "progressiveness" is obvious in those concerns which retained a two-cycle engine, or a chain drive; but the shrewdest men in the industry were often in doubt as to which course they ought to pursue. Even so clear-visioned and brilliant a leader as was W. C. Durant at that time stated that one reason for amalgamating, into the General Motors Corporation in 1909–1910, concerns making so many widely varying products was that there was no certainty as to what would happen.[14]

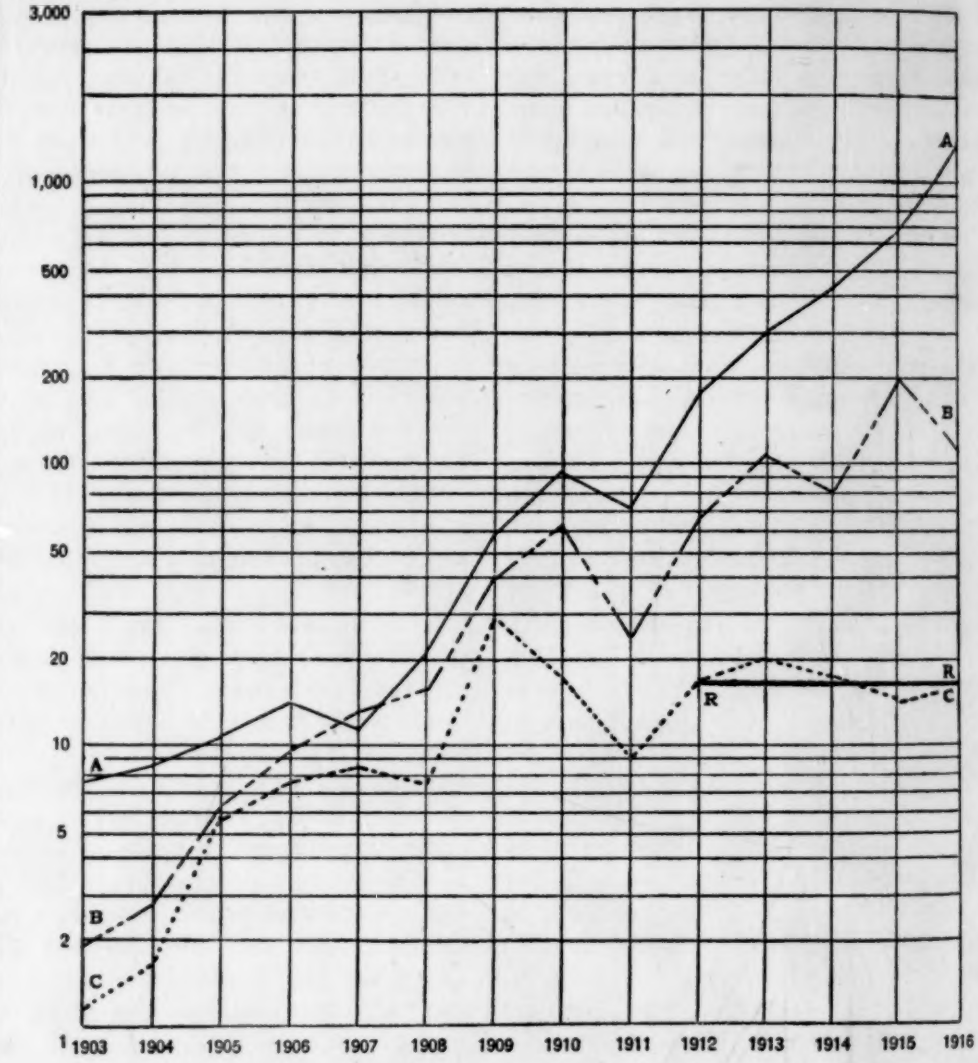
Conditions such as these probably explain the rising proportion of failures between 1907–1912. Constant uncertainty as to what the progress of the industrial arts would next bring forth was coupled with doubt as to the extent of the market and the preference of the public for particular types of vehicle. Not only, during these years, did the demand for high-priced cars shrink relatively; it fell off *absolutely* as well. Chart V classifies cars into these broad groups: low-priced, medium-priced, and high-priced cars, the latter being those

[14] See, for Durant's statement in this connection, the quotation of A. B. C. Hardy adduced by Lawrence Seltzer in a University of Michigan doctoral thesis (1925), *Capital in the Automobile Industry*, p. 153.

selling at $2,776 or over. While the actual (as well as proportional) sales of the first two groups of cars kept on generally increasing after 1907, the actual (as well as proportional) sales of the last-mentioned group suffered a decrease after 1909. This decreased sales figure for the high-priced cars became practically fixed at the same lower level from year to year between 1910

Chart V

Factory Sales of Low-, Medium-, and High-Priced Automobiles, 1903-1916



Curve A: Cars retailing at or under $1,375.
Curve B: Cars retailing at amounts from $1,376–$2,775.
Curve C: Cars retailing at or over $2,776.
Curve R: See text.

and 1916, as shown by curve *C* of Chart V. The short, straight line *R* of this chart indicates the estimated replacement demand for high-priced cars during those years, that is, that demand which would have constituted the total sales volume for cars of this class had the market for them been perfectly "stabilized." This stabilization (or, if the term is used in its proper sense of denoting not a cessation, but a continuance of demand at some regular annual rate, this near "saturation") of the high-priced car market between 1912 and 1916 is strikingly attested by the close correspondence which exists between curves *C* and *R* of our chart.[15]

Thus, the extraordinary exit figure in 1910, of 25% of all firms engaged in the field, is probably due, above all, to the absolute falling off in the demand for high-priced cars which occurred in that year. Many manufacturers who could not, or did not, successfully adapt their facilities to the production of lighter-weight, four-cylinder vehicles during that and the two years which immediately followed, were obliged to retire from business. They were, in Marshall's words, the firms already "feeling themselves behind the age." The one producer who preeminently was ahead of his time in this respect was Ford. His company made a heavy 6-cylinder machine in 1907, but discontinued it in the following year and, ever since, has stuck to the now ubiquitous light car introduced in 1908.

Following the year 1912, the percentage of failures fell almost steadily. It had been 12% in 1912; it became 9% in 1916, 6% in 1920, 1% in 1921. How explain a decline as great as had been the general ascent during the period 1907–1912?

In the first place, there was an increased ease of manufacturing. Not only were fundamental changes in design less frequent after 1912, but the general growth of the industry had made the purchase and employment of good materials and standard parts a fairly simple matter. The establishment of the mechanical branch of the Association of Licensed Automobile Manufacturers, in 1906, had marked the beginning of a general program of cooperative technical research. The movement towards the standardization of materials and parts, initiated by Howard E. Coffin, Henry Souther, and Coker F. Clarkson, received a fresh impetus in 1910 when, upon the breaking up of the Association of Licensed Automobile Manufacturers, the Standards Committee of the Society of Automotive Engineers was formed.[16] "The apparently easy path (of standardization) was strewn with pitfalls, which it

[15] The average annual demand for automobiles of the class represented by curve *C*, between 1912–1916, was, according to that curve, actually 17,400 cars (arithmetic mean). The "normal replacement demand," estimated on the basis of the number of cars left in service at the end of 1911, and each subsequent year through 1915, averages 17,800 cars (arithmetic mean). The yearly results of my calculation are as follows:

Years	Theoretical Replacement Demand	Actual Market Demand
1912	16,000	18,000
1913	19,000	20,000
1914	18,000	18,000
1915	18,000	15,000
1916	18,000	16,000

The assumption which I have here made is that a high-priced car was, on an average, used by its original owner for four years before it was replaced by a new car. For a fuller explanation of replacement demand and the method of its computation, see Leonard P. Ayres, *The Automobile Industry and Its Future*, Cleveland Trust Company, pamphlet, 1921.

[16] Dunham, George W., "S. A. E. Standardization," *Journal of the Society of Automotive Engineers*, Vol. IX, No. 6.

took years of study and continuous effort to learn to overcome." Eventually, however, order was brought out of what formerly had been chaos. Instead of 800 different sizes of lock washer which the parts makers had been making, 16 standard sizes were adopted. In place of 1,600 kinds of steel tubing, 210 types were specified. The number of alloy steels employed was reduced to less than fifty.

The importance of this procedure for the survival of many firms, especially the small ones, was great. In 1907–1911, because of the absence of standardization, and thus of the lack of interchangeability, in carburetors or ignition apparatus, "major alterations in engine construction were required to change sources of supply."[17] Subsequent to 1912, however, conditions such as these disappeared. Not only were the specifications of fabricated parts standardized, but those of materials as well. The steel-maker was no longer "enabled to get around a bad corner" by unloading an inferior lot of material upon any unwary automobile manufacturer;[18] he had to meet the stringent engineering specifications available to all car designers and purchasing agents in the *Society of Automotive Engineers' Handbook*.

Not only did the purchase of standardized parts and materials become much easier between 1913–1921, but their relative costs became much lower. Production on a steadily growing scale resulted in both external and internal economies; lower costs enabled manufacturers to sell their products at lower relative prices, and each lowering of price increased the quantity sold. The number of entrances into the industry could greatly exceed the number of exits, between 1913–1921,[19] and the proportion of failures could be comparatively low, because most companies during this period engaged in the production of inexpensive cars and the market for low-priced cars kept on expanding at a remarkable rate.

A further cause of the falling proportion of failures between 1913–1921 probably lies in the fact that this period was one of rapidly rising general prices. Except for the year 1914 and a part of 1915, the country enjoyed general "prosperity"—money conditions were easy, full employment prevailed, large numbers of the working class received higher money wages than ever before. In accordance with the common difficulty of distinguishing real purchasing power from money income, many workers spent their wages more freely than ever; and the purchase of automobiles was a popular form of expenditure. Ability to purchase was also doubtless made easier by the new institution of instalment sales which developed during these years.

But with the crisis of 1920, and the depression of 1921–1922, came a sharp reversal of general business conditions. Twenty-two firms withdrew in 1922–1923. Fourteen more exits were made in 1924. As shown in Chart III, the proportion of failures steadily rose from 1% in 1921 to 19% in 1924.

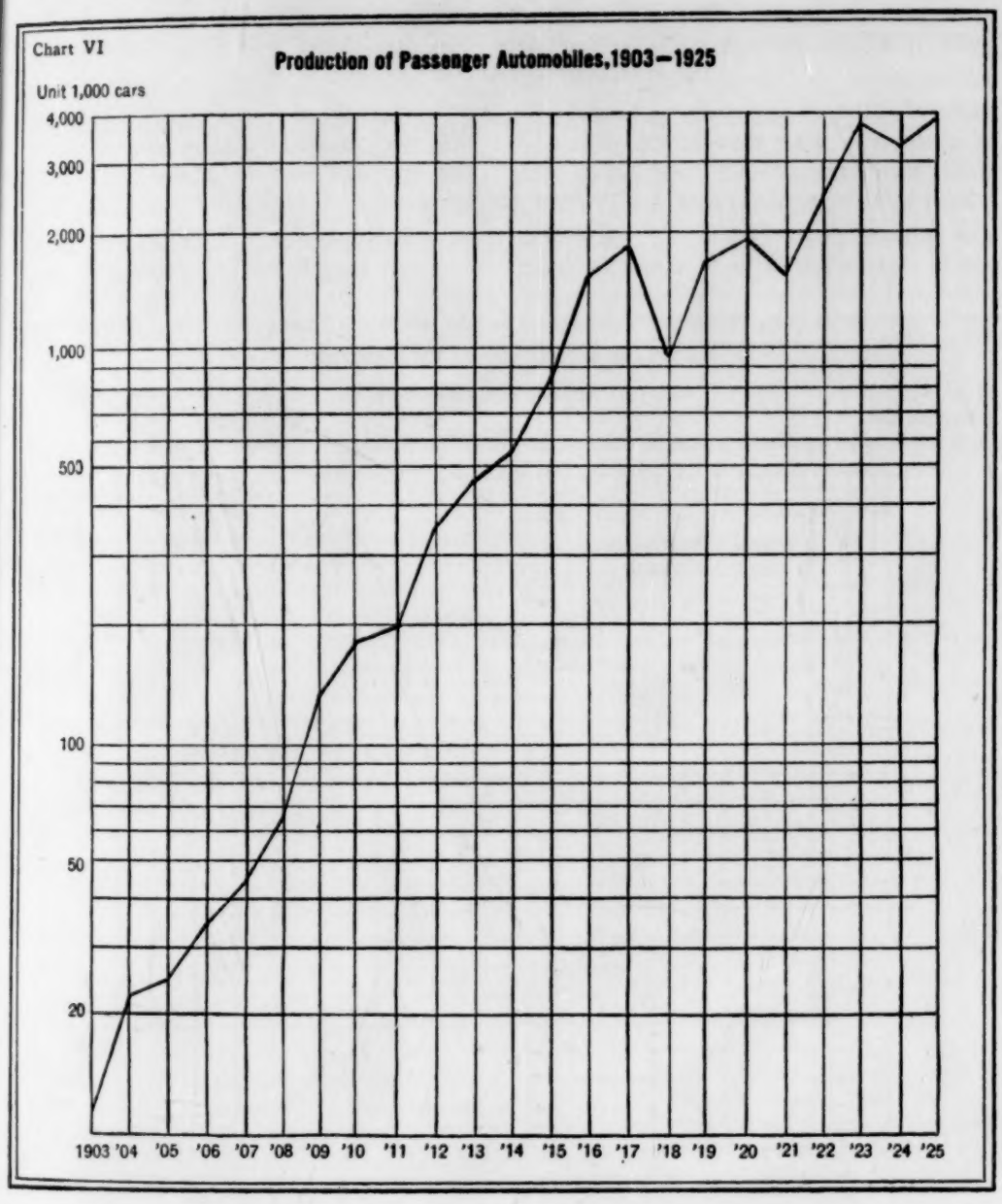
The failure figures of 10% in 1922 and 14% in 1923 are due largely to the influence of general business conditions, rather than to any characteristics of the automobile industry itself. But the 19% failure figure for 1924, on the other hand, *may* indicate the beginning of a new phase in the history of the industry. Chart VI indicates that 1924

[17] Bachman, B. B., "S. A. E. Standards," *Journal of the Society of Automotive Engineers*, Vol. IX, No. 6.

[18] *Ibid.*

[19] Eighty entrances as compared with 49 exits.

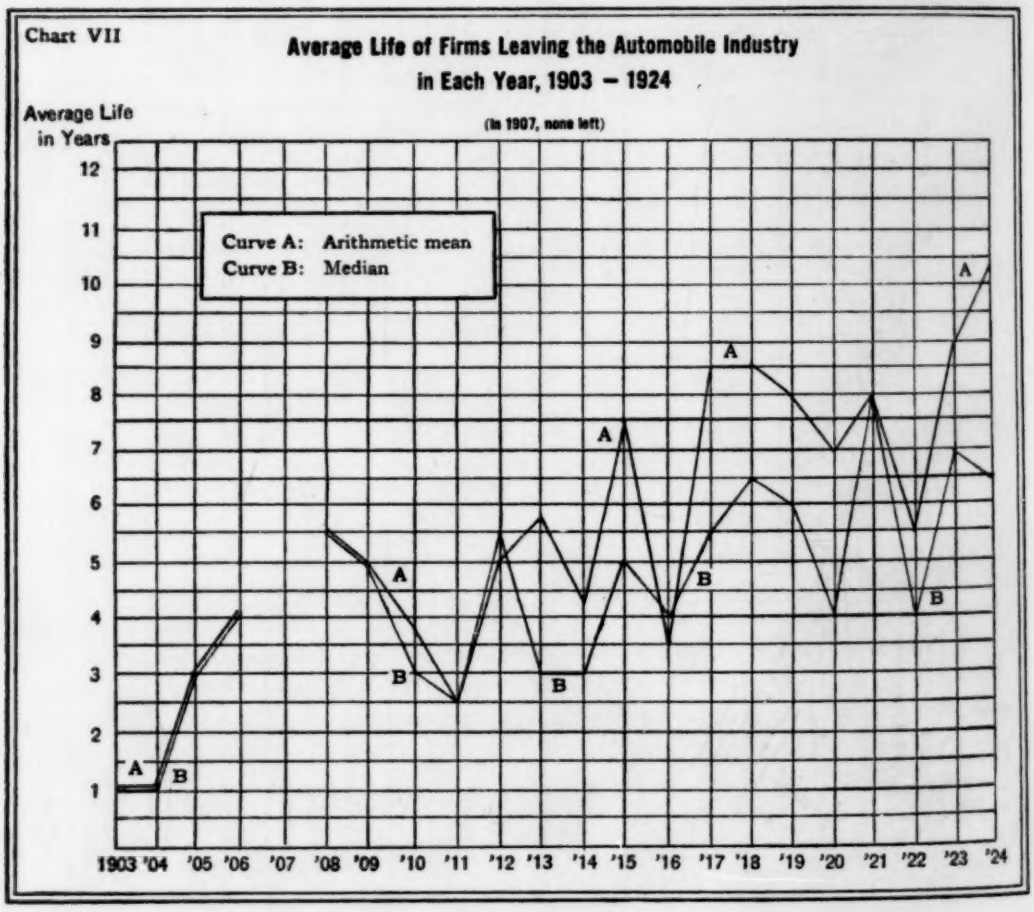
was the first year, other than one of war or of deep general business depression, in which the total number of automobiles produced (in all price classes taken together) showed an absolute decrease from that of the year immediately preceding. There has been a slight general tapering off in the rate of growth since 1916, but this tapering off up to 1923 was probably due largely to the war period, when passenger-car production was curtailed in favor of trucks, combined with the cyclical disturbances in 1920–1922. That production underwent an absolute decrease between 1923–1924, however, may, in the ab-



sence of any rapid development of the export trade, prove to be of significance. True, a recovery was made in 1925, when production reached the 3,855,000 car mark (if automobile trucks are included, motor vehicles produced total 4,200,000), thus representing a slight increase over both the 1924 figure and the former high-water mark of 3,650,000 cars in 1923. But the rate of growth which the 1925 figure foretells (considered in conjunction with the general slope of the curve in Chart VI) is much less than that which prevailed throughout the period 1903–1916, and seems to be somewhat less than that for the period 1917–1923. It should be made clear what is here meant. Cessation of demand is in no way indicated and is, indeed, utterly unthinkable. But an approaching stabilization, or a tapering off of the curve showing the *rate* of increase, is clearly to be recognized.

IV. Average Life of Firms Leaving the Industry

There remains one more tabulation. The length of life has been computed for *all* firms throughout the period 1903–1924. A final question which this computation ought answer is, did the average life of those *firms which have each year failed* become altered over this period? The figures on the average length of life presented above



(8 years arithmetic mean; 6 years, median) were for the entire group of 180 companies which engaged in business between 1903–1924. Thus, there were included the firms which remain in business at present. If, however, the 59 companies now remaining in business be eliminated, the averages that hold for the 121 firms which over a 22-year period have come and gone are slightly different; the arithmetic mean is 6.5 years, the median, 5 years.

TABLE I. FREQUENCY DISTRIBUTION OF FIRMS RETIRING FROM PASSENGER CAR MANUFACTURE IN EACH YEAR, 1903–1924, ACCORDING TO NUMBER OF YEARS THEY WERE ENGAGED IN THE INDUSTRY

	Number of Years Engaged																							
Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1903	1																							
1904	1																							
1905			2																					
1906				1																				
1907																								
1908					1	1																		
1909					1																			
1910		8	3	1	1	2		3																
1911		1	1																					
1912	3			1				1		1		1	1											
1913	1	2	1					1			1			1										
1914		3	1			2			1															
1915		1	2				1			1										1				
1916	1	2		3					1															
1917					3	1									2									
1918		1		1		1	1									2								
1919	1			1				1									1							
1920		2		1		1														1				
1921								1																
1922	1		3	1			1	1	2															
1923			2	2	1		2		2		2										2			
1924				1	3	3	1	1		1	1										1	1		1

The distribution of each year's mortalities, based upon the outgoing companies' individual lengths of life, is shown in Table I. The averages for each year, for quicker examination, are shown in Chart VII.

Both these arithmetic means and the median yearly figures for the life of outgoing firms fluctuated first one way and then the other between 1903–1916. Neither figure had risen above 5.5 years by 1916, and both averages stood then about as they had in 1906, at 4 years as compared with 3.4 years in the case of one, and at 4 years both times in the case of the other. But between 1916 and 1924, there occurred a marked and an almost steady rise in both figures, until by 1924, the median stood at 6.5, while the arithmetic mean (affected by the exit of several old companies, each of which had lasted over 20 years) reached the still higher figure of 10.2 years. The reasons for the increase of the median figure (which is not affected by these extreme cases) during the period subsequent to 1916 are doubtless the same as those which accounted for the marked decline in the percentage of failures from 1916–1924: increased ease in manufacturing, and great expansion of the low-priced car market, with a growing recognition on the part of many companies that this was the profitable market to supply. It was undoubtedly the stabilization in conditions of productive technique which chiefly caused this rise in length of life. Had there prevailed the same necessity for frequent radical changes in design and construction, and the same difficulties in the way of making these required alterations, as existed in the period before 1910–1912, many concerns would have been forced out sooner than they were.

What the future will bring in the way of exits from the field, now that the conditions of production have become relatively stabilized, will depend primarily upon the demands of the market. There is, of course, an interrelation between the prices of products and the ability of producers to offer given supplies of goods. But while the interaction of supply and demand may be held to determine the "normal" price of a competitive product over a long period, this "normal" or "long-run" price, in the economist's sense of the term, is an elusive if not wholly non-existent category in a rapidly developing industry where constant change is the order of the march. In automobile manufacture before about 1912, it was, speaking loosely, easier to sell cars than to make them. Since 1912, because of great technical strides, it has become much easier to make them. Now, with the annual aggregate demand for cars growing at a less rapid rate than in former years, it may shortly become easier to make automobiles than to sell them.

In this future competition, which firms will rise and which will fall? What light, if any, the history of an earlier period can throw upon this question will be discussed in the next article.

FUNCTIONS OF MUNICIPAL GOVERNMENT WHICH AFFECT BUSINESS AND INDUSTRY[1]

By A. H. JOHNSON

III. Traffic and Transportation

WILL Broadway in New York, Broad Street in Philadelphia, and Michigan Avenue in Chicago—the main streets of the past generation—become the back streets of the coming generation? Will department stores and other central stores which depend for their volume of business on the myriads of people who come to a certain shopping center to do their shopping have to decentralize and spread to suburban shopping centers as have the grocery stores and drug stores?

Such were recent predictions by a prominent automobile manufacturer, who sees in the development of the automobile a revolutionizing of the character and location of retail business. And one who can picture the growth of the automobile industry in the United States from a registration of 2,500,000 vehicles in 1915 to a registration of over 20,000,000 vehicles in 1925 needs to stretch his imagination but little to visualize dire results from the inevitable congestion and confusion which results from superimposing modern transportation methods on a century-old physical layout of its streets.

Traffic congestion, which has become a serious problem in small cities as well as in large cities, has been recently the subject of many and varied complaints, predictions, and solutions. Depending upon the point of view taken, contrasting pictures are drawn. The engineer visualizes the "super-city" with mammoth skyscrapers and tiers of streets to accommodate each class of traffic. He draws upon the city map the ideal street layout—new, wide streets to be cut across existing blocks, a wider street here, a park or civic center there—with little regard to the enormous costs, legal entanglements, deep-rooted traditions, and political difficulties inevitably to be encountered. The economist and the sociologist fear a point of diminishing returns if further concentration of business centers is continued. The automobile manufacturer sees the inconvenience of traffic congestion as a cause for decreased use of the automobile.

Among retail merchants, wide divergence of opinion on traffic is evident. Some regard the automobile as a factor leading toward greater urban concentration, a widening of retail shopping areas to support mammoth city central shopping districts. Many merchants look upon congestion as evidence of prosperous business, and protest against measures to clear the streets of parked vehicles. Others consider the automobile and unrelieved traffic congestion a menace. They foresee decentralization, with the creation of suburban shopping centers which in turn will become equally congested, causing further scattering. They recognize the passenger automobile as a most inefficient means of utilizing street space.

Whatever may be the view-point of the business man regarding traffic and transportation, he must look to the city government for any definite action to

[1] The first part of this article appeared in the October, 1926, number.

improve conditions. Traffic regulation has become one of the most important functions and perhaps the most vexatious function of municipal government. In the early years of the automobile, any regulation came under the "police power" of the city, and the rules or ordinances were designed primarily to prevent accidents. Although safety is still a necessary aim of regulation, it has become secondary to the great problems of expediting movement of traffic and relieving congestion.

Losses Attributable to Traffic Congestion

It is unnecessary to enumerate in detail the losses suffered by business and by the community as a result of traffic congestion. Most businesses have experienced the annoyance and increased cost resulting from delayed deliveries of both outgoing and incoming merchandise. The frequent inability of express and freight carriers to park conveniently near delivery points has increased the costs of such service. These increases in cost must be borne by the merchant in higher rates for service and eventually by the consumer in higher costs of merchandise. The most evident losses to central retail stores are those of sales volume, because customers withhold their patronage or transfer it to outlying stores to avoid the inconvenience of parking cars near shopping points. In addition to lost and diverted business, less tangible effects on sales volume result from the impatience or anxiety of customers who have cars parked in places with limited time allowance. In smaller cities where many people drive to work, the late arrival of employees is a source of annoyance.

The total cost to the community of time wasted by traffic delays has been variously estimated in different cities. For New York and its environs it was estimated in 1924 as approximately $1,000,000 per day.[2] Detailed traffic studies in a city of more than 175,000 population indicated that traffic delays cost that community $35,000 a day. In a city of about 400,000 population the cost of traffic congestion was estimated at $100,000 per day.[3] And not least among the costs of congestion is the increased fire hazard in delays of fire apparatus and the frequency of finding cars parked and locked near fire hydrants.

The Parking Problem—Its Economic Significance

The problem of whether or not to restrict parking is a problem solely for the city governing body to decide, yet any decision by the governing body touches so vitally upon the interests of the retail merchants that they frequently have attempted to dictate their desires. Because a city's traffic regulating body, whether the police department, city council, street department, or planning board, must, if unbiased, consider other than retail interests, its attitude frequently differs from that of a business men's association or chamber of commerce.

In the eyes of the city government, the primary use of the public roadways is for passage of vehicles, and all other uses are secondary. Accordingly, the city must use its power to keep streets clear of obstructions and to secure the greatest expedition of traffic movement with a maximum of safety. To achieve this purpose, city councils have passed

[2] *Regional Plan of New York and Its Environs*, 1925, page 61.

[3] Reports of National Conference on Street and Highway Safety.

or considered ordinances prohibiting parking on certain busy streets, and have passed or considered ordinances providing for the blanket prohibition of parking in entire down-town districts.[4]

The reaction of merchants to regulation of parking has varied. It was principally because of complaints by wholesale firms, merchants, and teaming companies against parking that the Boston Board of Street Commissioners proposed in 1925 to prohibit parking in the entire down-town district before 10 a. m. and between 4 p. m. and 6 p. m. The proposal was dropped because of protests by the Chamber of Commerce and representatives of the stores.[5]

Typical attitudes are illustrated in the following opinions, which were expressed before the last midwinter conference of the Property Management Division of the National Association of Real Estate Boards:

The retailer should have no objection to severe parking regulations in central business districts, for the reason that the cluttering of space in front of a retail shop by parked automobiles actually lowers the rental value of the property in question. The store gets no business value from the mere fact that a car is parked in front of it.

Automobiles must not be permitted to park on business streets. The effect of such parking is not only to congest and slow down traffic, but also to result in injury to the retail shopkeeper in front of whose store such parking is permitted. It takes away from the retail shopkeeper the advertising value of his shop windows and hinders the access of customers to his shop.

Too severe restrictions governing the parking of automobiles have resulted in loss of business in congested business centers. This in turn has resulted in the lowering of rents and depreciation of the value of the properties.

Certainly in large cities the automobile has become a necessity for the shopping of women, both for their own individual needs and the needs of the family. Consequently, some adequate provision must be made for parking.

While the principle is sound that moving vehicles must have priority in the city streets, and that commercial vehicles, upon which depend the expeditious transportation of merchandise, are of first importance, it must be recognized that passenger cars have important uses in the commercial and economic life of the city, and that every moving car has a destination either within the city or without. If some provision be not made for the standing of the vehicle at its destination, the purpose for which the vehicle is moving

[4] Cincinnati in 1925 defined a "congested district" in which parking was prohibited during peak traffic load, and at all times on streets less than 30 feet wide between curb lines. In other cities, notably Chicago and Philadelphia, complete all-day prohibition of parking in congested districts has been the subject of vigorous agitation.

[5] The Boston Board of Street Commissioners, which the state by statute had empowered to regulate street traffic, held public hearings on the proposed blanket prohibition of parking. The regulation was designed primarily to expedite traffic in rush hours and to eliminate the practice of "all-day" parking by people living in the suburbs who worked in Boston and utilized the public streets as a free garage. The existing regulations provided a blanket 20-minute parking limit on most streets in the down-town district. This limit had not been enforced, however, because of an inadequate police force and lack of court cooperation. The resulting congestion was estimated in newspaper reports as costing Boston business firms over $7,000,000 yearly, through delivery delays and diverted business. At the public hearings many citizens, and representatives of real estate associations, banks, law firms, and teaming and express companies urged adoption of the blanket prohibition of parking. The Chamber of Commerce and representatives of department stores opposed the plan. Traffic counts by Chamber of Commerce representatives indicated that passenger cars constituted 61% of the total vehicles entering and leaving the central business district, while motor trucks constituted 29% and horse-drawn vehicles constituted 10% of the total. These counts indicated also that the long-time parker was not a serious factor. In different counts, between 57% and 61% of the cars noted had parked less than 20 minutes, and between 86% and 87% had parked less than one hour. It was argued that such regulation would tend to shorten the business day and would interfere seriously with the legitimate use of passenger cars.

will be defeated. Some provision, either public or private, for the standing of vehicles at their destinations must be made, therefore, to follow closely upon prohibitive parking regulation. Municipal garages, large down-town private garages, and private parking arrangements by department stores for their customers are being advocated and adopted to afford partial though inadequate relief.

It becomes increasingly evident, however, that the solution of traffic congestion and parking problems cannot be standardized to apply to all cities, and that any discussion of the problems must consider the differences in type of business and size of city. It is apparent that all stores do not depend equally upon the automobile shopper for their trade, and that the relative proportion of automobile shoppers in large cities is much smaller than in small cities. A government questionnaire survey published in April, 1926, indicated that 13% of 120 stores reporting from cities over 200,000 population estimated that over 50% of their store patrons came in automobiles, while 49% of 480 stores reporting from cities between 2,500 and 10,000 population estimated that over 50% of their customers came in automobiles.[6] Few stores, however, have made definite researches to determine what proportion of their customers comes in automobiles. Estimates are likely to reflect the inclination of the individual store to consider itself as having a class of trade owning, hence shopping in, automobiles.

More truly indicative, perhaps, of the actual proportion of shoppers who use automobiles for shopping in large cities is the report of a three-day poll conducted in Cleveland. A total of 85,657 shoppers left a record of their mode of transportation to the down-town section. Of these, 19,551 came down in private machines, 53,738 rode on street cars, 8,910 used busses, and nearly 3,500 walked.[7] If figures were available to show by types of stores the proportion of automobile shoppers, they probably would indicate in the large cities a distinct difference between stores merchandising convenience goods and those selling shopping or specialty goods. Such differences are shown in figures available on hours of shopping peak and shopping time spent by customers in stores. The shopping period is longest in dry-goods, clothing, and furniture stores, and in these stores it is longer in large cities than in small cities.[8]

The noticeable trend toward decen-

[6] *Vehicular Traffic Congestion and Retail Business*, Bureau of Foreign and Domestic Commerce, Trade Information Bulletin No. 394. This publication reports the results of over 1,500 replies to a questionnaire. Of the stores reporting, 394 were classified as dry-goods, 89 as men's and women's clothing, 484 as hardware, 52 as furniture, 34 as jewelry, 272 as shoe, 41 as grocery, and 60 as drug. That more than 50% of their total store patrons came in automobiles was reported by:

13% of 120 stores in cities over 200,000 population
16% of 124 stores in cities between 50,000 and 200,000 population
30% of 240 stores in cities between 10,000 and 50,000 population
49% of 480 stores in cities between 2,500 and 10,000 population.

[7] The results of this poll conducted by the Cleveland Railway Company were reported in Boston newspapers on June 12, 1926.

[8] Bureau of Foreign and Domestic Commerce, Trade Information Bulletin No. 394:

AVERAGE SHOPPING TIME REPORTED BY STORES

Cities over 100,000 population	Less than ½ hour	½ hour to 1 hour	1 hour
Dry-goods	11%	36%	23%
Hardware	75	25	0
Clothing	75	14	11
Grocery	89	11	0
Shoe	46	50	4
Drug	95	5	0
Jewelry	75	25	0
Furniture	23	50	23

tralization of certain urban business has been attributed in perhaps too large a degree to traffic congestion and strictness of, or lack of, parking regulations. These have been contributing factors, to be sure, but the underlying reason has been the growing tendency of convenience goods to be sold nearer the home of the consumer and of shopping goods to be sold at centralized or focus points. The result logically is a grouping of trading areas, each type of store, depending on its character, attracting trade from a larger or smaller radius. Convenience goods, such as drugs and staple groceries, seem well adapted for distribution from neighborhood stores of small unit size, while in shopping goods there are natural economies to be gained from the concentration of large department stores and smaller specialty shops at central points. These natural economies are largely nullified, however, unless the freedom of circulation of the masses in central portions of the city and the ease of access to the central portions are maintained. This is not a plea for unrestricted parking or regulatory methods aimed at encouraging the use of the private automobile in shopping. It is, rather, a recognition that the growth of the city and the continued prosperity of centrally located businesses must depend more and more on the development of rapid transit facilities and the coordination of these facilities with local city transportation, such as busses and taxicabs, which are more efficient in the utilization of limited street space than are private automobiles.

Eventually, blanket regulations prohibiting parking on most streets of down-town sections in large cities will become necessary. This need not injure the central retail district, since it has been shown that the automobile shopper has become relatively a less important factor than the shopper using other means of transit. A certain volume of trade will continue to use the private automobile, and stores catering to this trade can solve their problem by developing nearby garage facilities for their customers.

In the small and medium-sized cities the problem of parking restrictions is really more serious than in large cities, since the proportion of automobile shoppers is larger and since the smaller community is unable to support elaborate rapid transit facilities. Unless provision is made for the parking of shoppers' vehicles near the central district, or at outlying points with convenient means of transportation to the central district, the business centers which found their market area so increased by the advent of the automobile will ultimately experience a contraction of that area. The controlling factor in

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(*Footnote 8 continued from page 178*)

Cities 50,000 to 100,000 pop.	Less than ½ hour	½ hour to 1 hour	1 hour
Dry-goods	37%	42%	19%
Hardware	100	0	0
Clothing	50	50	0
Shoe	53	45	2
Cities 10,000 to 50,000 pop.			
Dry-goods	42%	50%	6%
Hardware	98	1	1
Clothing	67	33	0
Shoe	67	30	2
Cities 2,500 to 10,000 pop.			
Dry-goods	60%	32%	7%
Hardware	90	9	0.5
Clothing	75	25	0
Shoe	72	27	1

TIME OF DAY AT WHICH STORES REPORTED MOST BUSINESS

	Opening till 11 a.m.	11 a.m. to 3 p.m.	3 p.m. till closing
Cities over 100,000 population	4%	71%	25%
Cities from 50,000 to 100,000 population	2	51	47
Cities from 10,000 to 50,000 population	15	13	72
Cities from 2,500 to 10,000 population	32	8	60

the continuance of the centralized business district is accessibility, whether furnished by the private automobile or by other means of transit.

Usually representatives of transit companies and merchants oppose traffic regulation and parking restriction, a mistaken attitude because by far the greater portion of those entering and leaving the down-town district do so by means of public rather than private conveyances. In Philadelphia, a vice-president of the rapid transit company found that 90% of the population of the city rode in electric cars, and that 76% customarily used this means to get to the retail center. He further estimated that of 7,000,000 square feet of street space available in the central district for vehicular traffic more than ⅓ was appropriated daily by parked cars. He figured that, based on the average real estate assessment value in that district, the space occupied by parkers had a rental value of $7,000,000 a year, which amount represented the degree to which the city subsidized automobile parkers.

A further development of the view that it is not a function of the city street to provide free parking space was illustrated last year in Boston, when the Mayor's committee on new sources of revenue proposed a special tax of $10 on all cars which desired the privilege of parking in the city streets. This tax was suggested principally as a method of compelling the citizens of surrounding suburbs who worked and traded in Boston to pay their share of the upkeep of Boston streets.

Governmental Machinery for Traffic Regulation

The power of the city government to regulate traffic is derived from the state. As a result of the rapid growth in importance of this function, the governmental machinery has not kept pace with it. In the majority of cities, duties of traffic regulation and of enforcement of the regulations have been imposed upon uncoordinated bodies already overburdened with other governmental or administrative duties. It is evident that the modern traffic problem requires scientific study and planning, a specialized and centralized power, coordination with city planning, zoning, and transportation, cooperation with business and social interests, and cooperation with legislative and judicial bodies to secure strict enforcement. Regulation has outgrown the stage of merely setting a city speed limit and telling a few merchants that they may prevent parked cars from blocking their delivery doors. Adequate traffic regulation requires much more than this.

Traffic regulatory power in different cities may be vested in the city council, the police department, the street department, the planning board, or in various other bodies. Regulations take the form of city ordinances, departmental regulations, and even charter provisions or amendments. When a city council, composed perhaps of 10 to 20 members, no one of whom is a traffic expert, must consider each minor change in traffic ordinances with limited knowledge gained from complaints or from poorly attended public hearings, is there any reason to expect other than unscientific, faulty regulation? Answers to a questionnaire by about 1,500 retail merchants placed faulty traffic regulation—either unenforceable, misfitted, or inefficient regulation—first among the conditions responsible for traffic congestion which interfered with business.[9] Second was lack of parking facilities.

[9] Bureau of Foreign and Domestic Commerce, Trade Information Bulletin No. 394.

Efficient traffic regulation can undoubtedly do much to relieve traffic congestion. But to accomplish this it is necessary to go beyond the superficial argument of the half-hour parking limit versus the one hour limit, or the rights of the delivery wagon over those of the pleasure car. It will be necessary to reach the source of regulatory power and to establish the planning, regulatory, and enforcement machinery on a basis where it can operate with the scientific thoroughness and efficiency needed for a function having such far-reaching economic effects.

Traffic regulation and the closely associated problems of transportation and rapid transit development are fundamentally problems of city planning. As such, in their broader aspects, they involve whole metropolitan districts rather than individual cities, and they should be the subject of study by city and regional planning boards. Such boards are the logical bodies to study the more costly means of reducing congestion.

A planning body properly should study the effects of building heights and densities on traffic congestion. Zoning laws should not be passed without thorough consideration of their future effect on the character and volume of street traffic. So, too, the possibilities of relief of traffic congestion by physical improvements, such as street widening, grade separation, planning new streets through congested districts, and developing by-pass routes to allow through traffic to avoid central districts, are proper subjects for study by a city planning board rather than by a city council or a division of the police department. Such projects are costly. Street widening in established business districts encounters almost prohibitive costs, and in the experience of some cities the expected relief has been lost through abuses of parking privileges.

The more local means of expediting traffic flow by regulation are so technical and so important as to warrant their study and regulation by a special body. A special division of the police department is perhaps the most logical, since originally all traffic regulations were enforced under the police power to prevent accidents. The police department, furthermore, is in an advantageous position to know the limit of enforceability of proposed regulations. In addition to parking regulations, the usual means to relieve congestion and expedite traffic consist of traffic policemen or signals at intersections, one-way streets, arterial highways, synchronized block signal systems, and the segregation of different classes of traffic on different streets. To be effective, all these require constant enforcement.

The making of numerous regulations which were beyond the ability of the police to enforce has been a common error in cities where the legislating body did not cooperate with the law-enforcing body.[10]

Where traffic regulation has been a function of the city council, similar ex-

[10] Boston illustrates a typical situation where the machinery for traffic regulation and enforcement is hampered by its set-up and by lack of cooperation. The state legislature by statute placed street traffic regulation in charge of a Board of Street Commissioners consisting of three members appointed by the mayor. In addition to regulation of traffic, the board has the power of laying out streets, ordering specific repairs, ordering construction of sewers, and granting various permits and licenses for garages or for special uses of the streets. The enforcement of traffic regulations established by the board, however, is a function of the police department which is under state control, and which is headed by a commissioner appointed by the governor. Although the city is required to pay all expenses of the police department, the commissioner cannot employ additional patrolmen nor increase salaries except by approval of the mayor. Since in the usual course of events the mayor represents a different political party from that of the governor who appoints the police com-

periences of lack of cooperation in enforcement are frequent. Furthermore, a city council, especially one made up of ward representatives, sometimes is prone to give unequal weight to local complaints or suggestions. In one medium-sized city, for example, residents along one street objected to night-time trucking of produce on that street. This trucking originated outside the city and was bound for a point also outside the city. An ordinance was proposed in the city council to prohibit trucking on that residential street. At a public hearing, residents of a parallel street which had a street-car line and poorer pavement protested that the ordinance would cause trucking to shift to their street and that they had as much right to be free of the trucking nuisance as had the residents of the neighboring street. Their protest caused the ordinance to be dropped.

In Cambridge, Massachusetts, in 1925 numerous complaints of residents against the parking of vehicles in front of their residential property caused the city council to report favorably upon an ordinance permitting property owners to forbid parking in front of their residences. Legal authority, however, gave an opinion adverse to the legality of such an ordinance.[11]

Enforcement of Traffic Regulations

Relatively too much attention has been given to regulation of traffic and too little to the enforcement of regulations. Enforcement is indeed a thankless task, and the police department is too frequently blamed by people who do not inquire into causes. Enforcement is made difficult when the body which establishes regulations has no power to enforce them, when the police department is curtailed in its force of men, when courts fail to cooperate with the police in sentencing violators and have no uniform fine, and when the procedure of punishing violators is slow and complicated.

The modern means of speeding up traffic enforcement center about the special traffic court, the traffic violation bureau, and the automobile pound. The special traffic court is designed to segregate traffic violators in a court where their cases can be dispatched speedily by specialized traffic judges. Such a court offers possibilities for an enormous saving of time and money both for the offenders and for the law enforcers.

Even with a special traffic court, strict enforcement of regulations results in reporting a large number of minor violations which require very little pres-

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(*Footnote 10 continued from page 181*)

missioner, there is frequent lack of cooperation. When the street commissioners in 1925 considered blanket parking restrictions, it was brought out at public hearings that the police force, undermanned in the traffic division, had been unable to enforce existing regulations, and had been unable to get approval for an increase in the force.

A further factor making enforcement practically hopeless was the court system. The magistrates of municipal courts in Boston heard cases involving violation of motor vehicle laws in the same sessions with cases involving other offenses. The municipal court dockets always were crowded, and the courts frequently did not uphold the actions of the police. Policemen making arrests had to appear in court at the hearings of their cases. They were not informed of the exact time the case was to be heard, hence they often were absent from their posts when needed most. This condition has caused recurrent agitation for a special traffic court, but no action has been taken.

[11] The proposed ordinance reads: "No person shall stand any car or other vehicle upon any street in front of any residential property upon which the owner has placed a notice forbidding such use of the street." The council frequently had granted permission to business firms and property owners to place "no parking" signs on the curbs in front of their property. These signs, however, had not been considered as having any legal force. The ordinance was not passed because the city attorney was of the opinion it could not be enforced legally, both because it was unreasonable and because it delegated authority to private citizens.

entation of evidence. Enforcement on such minor violations has been slowed down by the requirement that the police officer shall remain, for example, by a parked vehicle until he can serve the summons in person. To overcome this difficulty, cities have passed ordinances creating vehicle pounds and allowing police to tag vehicles.[12]

Detroit has gone a step farther by the establishment in the police department of a traffic violation bureau. This bureau was established in 1924 on the recommendation of a committee sponsored by the Board of Commerce, and assisted by representatives of other organizations such as the Automobile Club and the Bureau of Governmental Research. The traffic violation bureau is located at police headquarters. Violators are given cards directing them to report at the bureau within 24 hours. If they fail to report, a warrant for their arrest is issued and they are required to appear in court. Upon reporting at the bureau, the offender is given the option of paying a standard amount, depending on the offense, or of accepting a notice to appear in court on a certain day. From August 1, 1924, to August 1, 1925, the police department reported 167,236 traffic violations, of which 121,916 were settled by payment at the bureau with a minimum of wasted time and expense.[13] While doubt frequently has been expressed about the legality of the collection of fees by the police department in lieu of court trial and fines, this method has been effective. It certainly does save time, and its convenience is appreciated by motorists.

Future of Traffic Control

The problems caused by traffic congestion are inseparably associated with transportation and transit problems and with problems of city planning and zoning. We must look to scientific research and planning for the real solution of the problems from a long-time point of view. An increasing knowledge of regional planning and the trend in metropolitan communities toward unification under central control of the functions which affect entire areas will lead to a better understanding of traffic and transportation problems.

For immediate relief from evils of congestion, however, business must cope with the existing governmental machinery for regulation. This is not easily changed, but those who make the regulations can be guided into sound decisions if business men will cooperate and present facts developed from research. Some relief may be gained from further development of arterial streets, one-way streets, and block sys-

[12] In Cincinnati an ordinance provided that traffic officers should tag vehicles violating the traffic laws. The tag was given the force of a legal summons to appear at a designated time and place for trial. Vehicles remaining parked an hour after being tagged could be impounded by traffic officers and a fee of $10 collected before release. Payment of the fee did not release the driver from penalties for which the original tag was attached.

[13] A comparison of the first month of operation of the Detroit traffic violation bureau in August, 1924, with operation under the old system is illustrative. During the first 20 days of July, 1924, under the old court system, 6,225 complaints were made. A total of 450 police officers appeared in court and spent a total of 1,500 hours there. The average time spent in court by a defendant was 3½ hours. During the first 20 days of August, 1924, with the violation bureau operating, 11,705 traffic violations were reported. Only 24 police officers appeared in court and spent a total of 90 hours there. The average time spent in the bureau by defendants was five minutes.

A more recent newspaper report of the bureau's activities, however, was less favorable. This stated that of 11,287 persons tagged for parking violations in one month only 4,755 settled at the violation bureau and 287 were turned over to the court. The remainder disregarded the tags and the police were too busy to check up on them.

tems to expedite traffic movement. Segregation of fast-moving traffic, slow-moving traffic, and trucking can be further developed. Blanket no-parking restrictions in down-town sections are impending. These restrictions will result in greater use of taxicabs, busses, and rapid transit facilities. The Philadelphia Rapid Transit urges automobilists to park their cars at places provided at outlying terminals and to travel into the city by rapid transit. Better enforcement of traffic regulations through co-operation of legislative, enforcement, and judicial powers of the city offers a large field of improvement.

Retail merchants of their own accord have worked to improve their condition by securing garage space for customers, and by scheduling deliveries at times to avoid traffic congestion.[14]

IV. Aids to Efficient and Scientific Government

The foregoing discussions have served to show the need of scientific research in guiding the administrative functions of municipal government. The city governments themselves frequently have not the organization or the personnel for the most efficient and logical decisions. The business men and those of the community who are desirous of securing good government have recourse to two general types of civic agencies. The first type includes non-partisan citizens' associations organized to disseminate information concerning candidates and current governmental problems with the purpose of exerting an influence to improve the standards and caliber of candidates elected to municipal offices. The second type consists of agencies for scientific research in problems of governmental administration. They are entirely nonpartisan and take no sides on current political questions.

Typical of the first type is the Detroit Citizens League, which is a volunteer, non-partisan, non-sectarian organization of citizens financed by voluntary contributions and by dues of members. An advisory council of 50 citizens, representing all types of opinion, assists the executive board in determining policies of the league. A committee of 500 citizens secures facts and opinions on candidates for public office. A bulletin is published prior to each election containing lists of candidates together with their histories and qualifications, a discussion of civic issues, and the league's preference or recommendation as to candidates and issues on the ballots. Since its organization in 1912, the Detroit Citizens League has effected many reforms. It exposed election frauds and corrupt practices, was instrumental in securing new election laws, initiated petitions for revision of the city charter, and was influential in the adoption of a complete new charter.

Similar civic leagues exist in several other cities and undoubtedly they wield a strong influence for better government. They are successful as long as they do not in any respect become a local political party.

Municipal Research Organizations

From the view-point of business men, the most useful of civic organizations in the promotion of sound governmental decisions are the non-partisan research organizations supported by citizens. The ideal form is that of a

[14] A recent suggestion of R. H. Macy and Company, of New York, for reducing street congestion in daytime by making deliveries to business houses at night has been submitted to members of the Merchants' Association for consideration.

bureau supported by the community fund. Such bureaus, by maintaining strict impartiality, refraining from destructive criticism, and avoiding any activity in political issues, have succeeded nearly always in securing the cooperation of city officials. The purpose of a typical privately endowed research organization is set forth clearly in the certificate of incorporation of the Rochester Bureau of Municipal Research as follows:

> To serve the City of Rochester, New York, as a non-partisan and scientific agency of citizen inquiry; to promote efficient and economical municipal government, scientific methods of accounting and of reporting the details of municipal business in said city, with a view to facilitating the work of public officials; and for these purposes, to collect, classify, analyze, and interpret facts as to the administration of municipal government, and to make such information available to public officials and citizens, in order that inefficient methods of administration may be eliminated and efficient methods introduced and encouraged; and to promote the development of a constructive program for the said City of Rochester that shall be based upon adequate knowledge and consideration of community needs.

In some cities, research bureaus are financed by chambers of commerce, either as part of the chambers' activities or as semi-independent organizations with separate boards of control.[15] In a few instances, cities themselves have established and financed research bureaus, but these usually have proved unsuccessful since appropriations were limited, appointments were controlled by political parties, members of agencies would not risk justified criticism of city officials, and the agencies usually failed to secure the confidence and cooperation either of city officials or the public.

Another type of governmental research organization which is expected to inquire into city affairs for the benefit of the public is the state-appointed finance commission created to investigate methods of finance and administration. Such agencies, while useful in detecting or preventing fraudulent or grossly inefficient practices, rarely are a source of original constructive research.

It is to the privately endowed research agency that the citizen may look for unbiased constructive studies of governmental functions. The older established bureaus have built up creditable staffs of experts. The Detroit Bureau of Governmental Research, controlled and financed by the Detroit Community Fund, has a staff of from 7 to 10 well-educated, competent persons, expert in engineering, accounting, and problems of administration. The 1925 budget of the bureau was approximately $51,000. The Detroit Bureau during its existence has made many valuable fact-finding studies on a great variety of municipal problems. It has undertaken researches which the city government, if left to its own resources, probably would have been unable, or at least would not have been inclined, to attempt. Reports and recommendations of the bureau are usually given newspaper publicity and receive serious consideration by the city officials.

The complexity of modern governmental functions demands unbiased scientific research and dissemination of digested facts and figures if government is to be guided in sound and efficient channels. For them the business man may best look to his chamber of commerce or, better still, to a privately endowed bureau of research.

[15] Civic Affairs Department of the Indianapolis Chamber of Commerce; Bureau of Municipal Research of the Minneapolis Civic and Commerce Association; Bureau of Research, Newark Chamber of Commerce; Tax and Economy Bureau, El Paso Chamber of Commerce.

PLANNING SALES FOR A MANUFACTURING COMPANY[1]

By DONALD B. SMITH

THE duties of a business executive may be divided into two main types: making plans and administering plans. The administrative portion of the work may be subdivided to a considerable extent into definite tasks of a routine and repetitive nature. Specific instructions can be provided, outlining the course of action to be taken in all but the most unusual circumstances. The bulk of the work of administering plans thus can be delegated to less experienced and less capable hands. Such tasks are reasonably tangible and definite. The function of making successful plans requires, however, the use of broad experience and knowledge, keen discernment, and sound judgment.

Extensive experiments in the field of industrial management during the past 15 years have resulted in marked improvement in planning and controlling production. Since 1920 increasing interest has been evident in the extension of this development and in the coordination of all activities related to manufacture and distribution, a process sometimes referred to as "master planning." All this presupposes reasonably reliable forecasts of sales volume.

Since goods are manufactured or transported only to satisfy an expected need or demand of the consumer, the volume of demand in relation to price will be an immediate factor in determining the amount of goods to be manufactured, the requisite size of plant, amount of equipment, and number of employees and executives. Thus, planning and preparation in all departments of a business must proceed from an original estimate of demand and sales. The further this planning is carried into the various activities of a company, the more important this original estimate will become.

The necessity of estimating the future course of events is unfortunate; nevertheless, it is a stern requirement for successful operation of a manufacturing company under the highly organized conditions of modern industry. When production was conducted on a small scale to supply the needs of local consumption, it frequently was possible for the manufacturer to obtain definite orders for goods before purchasing his raw materials or employing his labor. Because of the increased volume and intricacy of operations, the extension of distribution, the necessity of training operatives as well as the desirability of developing an effective plant and a coordinated personnel, it has become necessary to begin preparations long in advance of actual manufacture, and to produce goods considerably in advance of actual demand by ultimate consumers.

Both the time of occurrence and the volume of demand must be foreseen. In so far as goods are produced in ex-

[1] The material in this article is based upon information which the writer secured in person from about 30 progressive companies which he investigated in gathering cases for the Bureau of Business Research, Graduate School of Business Administration, Harvard University. The results of investigations carried on by other agents of the Bureau also were used.

cess of demand, they cannot be sold at a profit, and the manufacturer may be forced to dispose of the goods even at a loss. In so far as goods are underproduced, profitable sales will be lost. A manufacturer desires, accordingly, to produce conservatively so that he may be assured of a market for all his goods. On the other hand, by increasing his volume to plant capacity, he usually can produce at lower cost per unit. In order to reduce costs, therefore, he desires to increase his production.

To select, evaluate, and relate these numerous and frequently opposing factors under circumstances made more confusing by the uncertainty of future developments, presents a difficult task. It is conceivable that there are executives who can think clearly through a mass of intangible and interacting factors and reach a sound conclusion. Decisions made in such circumstances tend to rest upon one or two tangible factors which happen to be of urgent and immediate importance. Instances have occurred repeatedly in which companies have based elaborate budgets and schedules upon sales estimates which were obtained from either hastily formed opinions of executives or superficial examinations of recent sales data.

Examples of thoroughgoing and well-developed experiments in sales planning are exceedingly rare. Scarcely a start has been made toward scientific investigation of its problems. No one method of approach can be applied universally without considerable adjustment. Each company must select an attack which will best suit the peculiarities of its own conditions. This does not preclude the development of general principles which may prove useful when applied to individual situations. A statement of certain phases of the problem of sales planning and a few suggestions regarding approaches to its solution are outlined in the following pages.

I

Estimates of future sales may serve two distinct purposes. First, they may provide quotas or standards for judging performance of sales branches or individual salesmen. Second, through schedules of production, inventory, expense, finance, and plant expansion, sales estimates may provide a basis for planning and controlling a company's internal operations.

The two purposes require, unfortunately, different types of estimates. A sales quota, for example, which will set a high standard of performance frequently is desired. Hence, an estimate to be used for that purpose often is optimistic and should include recognition of the potentialities of the market. Estimates to be used as a basis for scheduling production or budgeting expenses, on the other hand, should be conservative and should serve as a check on overexpansion of operations. These estimates should be based upon what actually will be sold rather than what should be sold. Estimates for quota purposes should be subdivided, furthermore, in considerable detail among the various sales territories, while estimates for purposes of production control should be subdivided among products.

Any attempt to serve both purposes by a single approach to the problem of estimating usually will not yield results satisfactory to either. It is essential, therefore, to divorce the two purposes, thus leaving the estimator free to select methods and materials with a single purpose in view. Results obtained for

one purpose may be adjusted to satisfy the other purpose, but such adjustment should be made only after completion of the original forecast.

Although there are several possible methods of estimating future sales in a manufacturing company, three general approaches to the problem may be defined. The first approach involves collection of estimates from numerous subexecutives and salesmen; the second involves analyses of markets; and the third involves analyses of a company's past records.

II

The first approach involving estimates by subexecutives and salesmen is employed most commonly. It is advantageous, in that the man "on the job" is familiar as no other person can be with conditions in his department. He can foresee, therefore, difficulties or benefits which may attend the introduction of a proposed program. On the other hand, his very nearness to the task may destroy his perspective. The subexecutive or salesman may "fail to see the woods for the trees." He may lack imagination and adaptability, with the result that when business is unsatisfactory, his estimates are likely to be pessimistic; when business is prosperous, he is likely to predict a continued large volume. Bias frequently is present in such estimates. Members of a sales force are prone, for example, to estimate high, unless a basis for compensation is being determined, because professional pride demands always improved performance in the future; the optimistic type of mind, which characterizes a good salesman, produces optimistic estimates of future sales.

In spite of these defects which may appear in estimates of subexecutives and salesmen, there are two incontrovertible reasons for inclusion of this approach in any plan for estimating sales. First, the process of making an estimate which is to be scrutinized by higher executives causes a subexecutive or salesman to analyze critically the work under his direction and to consider its potentialities. Such a study of the situation should react beneficially upon the conduct of his task. Secondly, no method of planning and controlling activities, however carefully conceived and executed, can endure or succeed unless full cooperation of subexecutives and salesmen is obtained. Such cooperation is more likely to be obtained if those who perform the tasks have had an active share in setting those tasks. The care and effort put into making estimates by subexecutives and salesmen will be directly proportional to the extent to which these estimates are scrutinized and used by the management. If this approach to the problem is employed, estimates obtained by other means should be used to furnish perspective in reconciling divergences.

III

Analyses of markets, employed in the second approach to sales forecasting, involves determination, by geographical areas, of the number of possible purchasers to whom the product of the company would be useful. In the case of consumers' goods, it involves elimination of groups of purchasers whose income is insufficient. Allowance then must be made in each sales territory for intangible factors such as competition or buying habits of the people. In the case of industrial or producers' goods, the relatively small number of customers in a territory frequently makes

possible a virtual census. Because of the large expense involved and the paucity of current data, market analyses can be made only at intervals of several years. Yet, in order to be useful for sales estimating, these analyses should be revised at least annually to allow for variations in such factors as the income of the various areas.[2]

This type of analysis is particularly useful when the purpose is to establish or revise sales quotas by territories. When the purpose is to provide a basis for planning production and allied activities, the usefulness of this approach in specific companies will vary directly with the importance of potential demand as a factor in forecasting sales.

At one extreme are industrial goods of large unit value, such as railway equipment, steam turbines or looms. Since a small number of customers purchase a large volume, manufacturers of these products may find it feasible not only to record the number and location of potential customers, but also to estimate in detail their requirements for the product and even their earnings, as an indication of ability to buy. Potential demand is important in such cases.

At the other extreme are manufacturers of consumers' necessities of small unit value, such as soap, matches, salt, or bread. The number of potential consumers of these articles is almost synonymous with population, and the chief problem of sales forecasting is to determine what portion of the total volume of business a particular company can obtain without excessive expenditure of sales effort. In the case of such articles, an increase in sales effort undoubtedly can produce almost unlimited increase in sales volume. Radical and sudden expansion of a company's business by this means is likely, however, not only to involve a diminishing rate of return because of increased sales cost per unit, but also to encounter limitations of plant capacity. It appears, therefore, that in estimating future sales for purposes of production control, a company which manufactures consumers' necessities would benefit little by use of a detailed and frequently revised market analysis.

IV

The third approach to the problem of sales planning is based on the assumption that analysis of records of a company's past activities will reveal characteristic variations, trends, or relationships which may be useful in estimating the future course of events. By this method the volume of sales is estimated, not with reference to potential demand, as in the analysis of markets, but with reference to a company's past performance. Such analyses are likely to discover, moreover, important inconsistencies or weaknesses in policies which have been formulated upon a basis of inadequate information.

This approach to sales forecasting has been employed least of the three, yet its possibilities for established companies are ordinarily greatest.[3] The use of simple methods of statistical

[2] The principal income sources of the people should be determined by examining the activities of the region; the income sources of the industries should be determined by discovering where the products of the region are marketed and what purposes they serve. Current conditions of these sources should be measured frequently. It is apparent, therefore, that the approach to the problem of sales estimating through market analyses leads frequently to extensive auxiliary estimates in a variety of industries and in numerous small geographic areas.

[3] Valuable lessons may be learned from experience in other fields of investigation. The progress of the natural sciences has been accelerated since

analysis frequently is desirable in order to bring into relief significant features of the data. It must be recognized that statistical methods are only tools to assist in visualizing data and, thereby, to aid in formulating judgments. They must not be expected to take the place of judgment. Any attempts to obtain sales estimates by a mechanical application of statistical method will lead to absurd results. Herein lies a danger which has caused the failure and abandonment of several experiments in sales forecasting. All estimates which are established tentatively, after analysis of past experience in the form of data, must be modified to allow for temporary, local, intangible, or personal factors or for matters relating to policy. Such modifications require judgment of the highest type.

Analyses of previous records may be adapted to estimates to be used for a variety of purposes. If, for example, sales quotas are desired, previous sales in each territory would be investigated; if estimates for production planning are required, previous sales for each product would be more useful. Thus the requirements of the moment should determine what data and what methods would be desirable. Attempts at such analyses in the hands of untrained workers frequently have resulted in stereotyped application of methods which were ill adapted to the problem, and in excessive expenditures of time and money on analyses of unwarranted refinement. These unfortunate experiences have caused this approach to be looked upon with disfavor by some executives. Many companies have a mine of valuable information lying unused in their records for lack of analyses which would indicate significant features.

V

The accuracy of sales forecasts based on analyses of records in an individual company is related directly to the stability of its sales. Stability is affected in turn by a variety of factors.

Age of industry. Usually as an industry grows older, its operations become more stable. In the early years of an industry, such as the rubber or automobile industries, rapid development of revolutionary improvements may so radically change the product or its distribution, or may so reduce its cost and subsequently its selling price, that sales forecasting will be extremely difficult.

Development of the market. The more thoroughly a market becomes developed and its potentialities realized, the more stable demand will become. Eventually, a point vaguely described as saturation is approached. For present purposes, saturation may be defined as the stage at which the majority of possible purchasers have been subjected to selling effort; that stage at which the bulk of sales result from repeat demand for articles to replace or supplement articles already possessed.

Age of company. As a company

(Footnote 3 continued from page 189.)
reliable data relating to natural phenomena have become available and since scientific methods of analysis have been applied to these data. The introduction of quantitative measures and statistical analyses into psychology marked a distinct advance in that study. Remarkable results have been obtained from recent experiments by the United States Department of Agriculture in forecasting cotton crops. These experiments have employed statistical analyses of past records and are reported to have provided estimates of greater accuracy than those based only on reports from field agents. Although forecasts in the field of business may not attain accuracy commensurate with forecasts in the natural sciences, use of quantitative measures and scientific analyses should reduce materially the error of estimates in many cases.

grows older its operations become more stable. Although a new company may commence operations in an old industry and with the most improved machinery, its development at first is likely to be slow. As a patronage is built up, and as the new organization becomes consolidated into a more effective unit, growth will be accelerated for a few years, then will become modified, and will progress thereafter by smaller increments.[4]

An old company may repeat these stages if it has occasion to enter a new field. The Studebaker Company, for instance, long a leader in the manufacture of carriages and wagons, gradually transferred its activities to the automobile field.

Size of company. Operations of larger companies in a given industry are likely to be more stable than those of smaller companies. This is chiefly because of the probability that fortuitous events or changes in personnel, policies, or local conditions will exert less influence on the operations of the large companies.

Degree of control of market. One of the most intangible factors for which to make allowance in estimating sales is competition. In the case of a company manufacturing a patented article which has no close substitute, this factor may be ignored, but as the degree of control of the market lessens, competition becomes increasingly active and difficult to gage.

Extent of integration. The factor of integration refers to the degree in which a manufacturer of fabricated material extends his operations back toward the raw-material stages of production; or inversely, to the degree in which a manufacturer of raw material extends his operations forward into the fabricating stages of production, or into marketing. The longer the time interval between a stage in the manufacturing process and the ultimate consumption of an article, the more difficult is the problem of estimating the requirements of consumptive demand at the time when the article will be completed. Hence, any companies which operate at early stages in production and successfully extend their activities to include more advanced operations should improve their opportunity to relate production to consumptive demand. Integration which involves reaching back into earlier processes, however, is likely to increase rather than diminish the difficulty of adjusting production to demand. By virtue of their extended view of operations, executives in a highly integrated company need make only one estimate of ultimate demand which then can be used to control policies in their earliest as well as in later processes.

Type of raw material. The stability of raw material supplies and prices have an effect on the stability of operations in a manufacturing company. Great variation in the importance of this factor is noticeable among industries. For example, a cement company which owns extensive deposits of cement rock scarcely need consider the question of raw material. At the other extreme, a rug manufacturing company which imports large quantities of jute is concerned both with the crop situation in producing countries and also with the transportation, tariff, and exchange conditions between those countries and the United States.

[4] This so-called Law of Growth has been investigated and developed by students of the subject with special reference to the automobile industry. See article by Raymond B. Prescott in the *Journal of the American Statistical Association*, December, 1922.

Type of product. The factors considered under this heading are related directly to the demand and uses of the product and are exeeedingly important in their bearing on the problem of sales forecasting.

1. *Industrial versus consumers' goods.* Industrial goods as a class fluctuate more violently in price and volume than do consumers' goods.[5] The distinction between instability and uncertainty should be recognized. Although a manufacturer of industrial goods of large unit value may experience wide variations in demand, yet, if his operations are conducted on firm orders not subject to cancelation, and requiring a long period for manufacture, he may know definitely several months in advance what will be his volume of production. Such is likely to be the situation of the producer of large electric generators, or the erector of buildings or bridges. This work, once started, usually is completed. On the other hand, a manufacturer of consumers' goods may have a relatively stable demand but may have little forewarning of variations. Orders for many types of industrial goods are not placed far in advance, however. In these cases, the producer fails to benefit from early receipt of firm orders. He is at a disadvantage, moreover, compared with manufacturers of consumers' goods, because he operates at an earlier stage in production and is farther removed from ultimate demand.

2. *Luxury versus necessity.* Regardless of the condition of business, people will consume a rather constant quantity of necessities such as salt or milk, but, if it is necessary to conserve the family income, they will discontinue completely the purchase of luxuries. A rigid distinction cannot be drawn between these two classes of goods.

3. *Style products versus staples.* Demand for products in which design or style have important influence is particularly unstable and difficult to estimate; first, because of eccentricities of consumers' tastes, and second, because the determination of whether a given style or design will sell successfully depends to a great extent on what other styles or designs are offered at the same time. Once a style becomes popular, furthermore, it increases the demand for articles of similar design. This is another phase of competition which already has been recognized as one of the most difficult factors to foresee. Presumably, statistical analysis never will throw much light on the vagaries of public favor or disfavor for style articles, but it is quite possible that the characteristics of demand for a style which already has found favor may be analyzed to advantage. Such investigations have proved useful to manufacturers of silverware. By statistical analyses they have determined the probable life of a design and govern thereby the production and stocks of silverware.

4. *Goods consumed rapidly versus durable goods.* The chief characteristic to be noted at this point is the ability of the consumer to defer demand. Repeat or replacement demand for a product may be estimated roughly on a basis of its length of life. Demand can be deferred only slightly for a necessity, such as bread, which is consumed in one use. If inconvenient to purchase new garments, however, old clothing may be repaired and its use prolonged, but the extension of use

[5] *Bulletin* No. 284, U. S. Bureau of Labor Statistics, p. 46. *Review of Economic Statistics,* Harvard Committee on Economic Research, Prelim. Vol. V, pp. 30 to 60, especially p. 55.

cannot be continued indefinitely; in the case of a piece of furniture, use may be extended and demand deferred for several years. Hence, the life of a product and the possibility of extending that life become important factors in gaging the difficulty of estimating future sales.

5. *Goods of small versus large unit value.* A more consistent and stable demand may be expected for articles of small than for articles of large unit value. Even at times of reduced earning power the average person will not be particularly careful of expenditures for articles which sell for less than 25 cents. Expenditures of large amounts, however, will be given more consideration, which may result in deferred purchases.

6. *Narrow versus diverse lines.* By increasing the diversity of its line of goods, a company may increase the stability of its total sales. Estimating sales of individual products or groups of products will be difficult. Diversity of products may be gained by producing either a large number of allied products or a less number with divergent uses. Addition or substitution of articles naturally will have less effect on sales of an extensive line than on sales of a limited line.

7. *Perishable versus unperishable goods.* Since a number of products, such as flowers, must be sold at any price or become a complete loss, perishability is a factor in estimating sales for that type of goods. Physical volume of sales may be predicted with more assurance than value of sales, which will be subject to unpredictable variation if sacrifice prices become necessary. This element of forced sale is present, but in less degree, in many other lines of business.

8. *Products related to weather conditions.* If use of a product is related directly to weather conditions, demand is particularly unstable and difficult to foresee. Demand for rubber shoes or umbrellas, for example, is dependent on inclement weather, whereas sporting goods as a class require favorable weather.

Type of distribution. The fewer the steps which intervene in the distributive process between manufacturer and consumer, the more stable should be the demand. Difficulties arise in this connection because of uncertainty regarding the amount of goods on dealers' shelves, and because of misestimates of demand and resulting overbuying at the various stages of distribution. A manufacturer who sells largely through chain stores will benefit from the centralized buying and strict inventory control of these organizations. It is significant that automobile companies are attempting to avoid difficulties of this type by establishing closer relations with their retail distributors. Companies which sell exclusively through house-to-house salesmen have found that their sales vary in some cases more directly with the size of the active sales force than with general business conditions.

Type of process. Plants which are organized to produce on a large scale cannot produce, as a rule, a small volume without greatly increasing unit costs. Under these circumstances, goods frequently will be produced and forced on the market even at reduced prices. Continuous processes present an analogous situation.

A review of this rather pretentious array of factors relating to stability of demand for the products of industry might seem to preclude the possibility

of estimating future volume of sales. This would be the case if each factor were sufficiently important to require individual weighing and analysis, but fortunately a few factors are of outstanding importance in a given situation. Emphasis will shift among the various factors as indicated in the foregoing discussion. Nevertheless, the composite effect of even a few interacting forces is difficult to determine and to allow for by pure reasoning. This must be done, however, if sales estimates are to be obtained by modification of a measure of potential demand as secured by a market analysis.

Herein lie two advantages of the approach to sales forecasting through analyses of past records; first, some of the important causes of variation can be measured approximately, isolated, and removed from the data. Variables, such as growth of a company and seasonal variation, are in this category. Secondly, whether or not the data are simplified in this manner, a record of past sales or orders presents a composite picture of the net result from these numerous interacting factors of demand. To a certain extent these factors may have operated in opposite directions, thereby nullifying the effects of one another. Although sales forecasting in a manufacturing company is exceedingly complex, the application of analytical methods to the factors, reduced to numerical form, can materially simplify the problem.

VI

The discussion up to this point has emphasized the relation of stability of demand to accuracy in sales forecasting. This should be distinguished from the feasibility of estimating sales. Feasibility is not dependent upon the absolute accuracy of the results. In staple lines, where stability is present, the risks of doing business are relatively small, and a narrower margin of profit will attract producers than in lines where variations in demand are violent and a wider margin of profit is necessary to absorb losses attendant on such fluctuations. If, in an industry established on a basis of a narrow net profit margin, a company misjudges future demand with an error of 10%, the results may well be as serious as an error of 50% in the case of a company accustomed to wider variations of demand and operated on a wider profit margin. The feasibility of estimating future sales should be determined on a basis of the relation between the error in estimates and the customary fluctuations in a company's sales.

A company usually is desirous of obtaining an estimate of total sales for one year in advance. This figure should be recognized as only tentative, and estimates for individual months or quarters derived therefrom should be subjected to revision at frequent intervals. The length of the period to be estimated will depend upon the stability of the particular company. In the automobile industry, for example, attempts to estimate more than three months in advance have been abandoned by some companies because of erratic variations of past sales caused by the development of the industry and the style element. Even where estimates are established for only three months in advance, monthly revisions are made.

Estimates should be revised at regular intervals. If revision of estimates is considered only when large discrepancies occur, it is likely that the task will be neglected and the estimates will fall into disrepute. In some experi-

ments with planning, a tendency has appeared to shape estimates for six months or a year in advance, and then to set aside the task as finished. Such a procedure in estimating cannot be applied to the dynamic conditions of business with results which will be of much practical benefit.

VII

The organization and operation of a system of internal control based upon sales estimates requires an executive with strong personality and varied training. First, the person who is to set tasks for other people and to check performance of those tasks must have a pleasing personality, tact, and the ability to "get on" with people. He must be able to win others to his point of view. The work is of a pioneering nature and requires that he have not only infinite patience in explaining and reconsidering methods, reasons, or decisions, but also a degree of firmness when he is assured of his ground and when the issue is important from the view-point of establishing precedent.

Second; in order to appreciate the broader significance of events and the interrelations of the specific company with its industry and with business in general, the executive should have a thorough knowledge of economics.

Third; he will require a knowledge of the organization and personnel of the company; he also must be familiar with the product, with its processes of manufacture, and especially with problems related to its distribution and sale. Such knowledge is useful in the analytical work and is requisite in winning the confidence of senior executives, the respect and cooperation of subexecutives, and the loyalty of foremen. Information should be obtained by actual contact with operations. Familiarity with the history of the company is essential, of course, to intelligent analysis of past records. An ideal way to have become conversant with the operations and personnel is to have held previously some established position in the company. This contact on familiar ground should serve to dispel the skepticism which usually attends the introduction of new processes into an old organization.

Fourth; the executive should have not only a theoretical knowledge of statistical methods, but also an appreciation of their weak and strong points and the significance of the results obtained by their application; most of all, he should have a high degree of judgment and discretion in regard to their use. The time and expense necessary for use of refined statistical methods require that they shall not be applied to data with a margin of error sufficient to nullify the precision of the methods. Knowledge of statistical methods is as essential, therefore, to the industrial statistician from the view-point of knowing when not to employ a device as of knowing when to employ it. Familiarity with labor-saving methods and short-cuts which will give approximate accuracy are an important part of this equipment.

It appears, therefore, that a member of the regular organization who is trained in economics and statistical method is the ideal type for the work of organizing and operating a system of internal control based upon sales estimates. It is important that his vision shall not have been narrowed nor his imagination dulled by long contact with a single type of work. A desire to experiment in new fields is a distinct asset.

It is essential that work of this nature be sponsored actively by a high executive of the company if the attempt is to have the respect and cooperation of the management as a whole.

VIII. Summary

Detailed planning of all phases of production and distribution is becoming necessary to the successful operation of a manufacturing company. A reasonably reliable estimate of future sales is the essential first step in such planning. Examples of thorough experiments in this field are exceedingly rare. The purpose for which forecasts are to be made should be defined clearly, as this will influence the method and material employed. Sales forecasts are used most commonly as bases for sales quotas and production schedules.

Three approaches to the problem of sales forecasting are in use: first, the accumulation of estimates from subexecutives and salesmen; second, the analysis of markets; third, the analysis of records. Although a particular approach may be used more effectively in individual cases, the methods are not mutually exclusive but are complementary. The first approach capitalizes the knowledge of the "man on the job," but estimates from this source may lack perspective. The second approach includes recognition of potential demand, but may lead to exceedingly involved and intangible analyses. The third approach, through analyses of records, deals with the actualities of the past and provides a means of visualizing the net result of many interacting factors affecting demand for a company's product. While such analyses provide valuable assistance in making decisions or estimates, any tendency to substitute statistical methods for judgment must be avoided.

The accuracy of sales estimates in an individual company will be related closely to the stability of its operations. This stability will be determined by numerous factors, such as the age of the industry, age of the company, type of the product, and degree of control of the market. A few factors usually will be of outstanding importance. The feasibility of forecasting sales in a specific company should be determined by relating the error of estimates to the customary violence of fluctuations in its sales volume.

An executive who will organize and operate successfully the planning and controlling activities of a company must possess tact, personality; familiarity with the company, the industry, and the product; training in economics and statistics, and judgment in their application.

A NEW METHOD OF STOCK CONTROL

By R. H. WILSON AND W. A. MUELLER

THE problem of stock control, common to almost every business organization and involving the materials used in the operations of its business, is dual-phased. Whether they are day-to-day supplies or raw materials, the items must regularly be shown on the balance-sheet as merchandise assets; and there is thus entailed a financial aspect of control. Control must also be exercised from the standpoint of stock maintenance—of keeping on hand sufficient quantities of the materials requisite to operation.

Satisfactory stores operation rests principally on the degree of continuous stock maintenance. Increased use must be provided for by laying in greater stocks. Against decreased use, on the other hand, there can be no provision except deferment of stock renewal. The rate of consumption is thus the gage by which stores operation is usually set and, in turn, stores economy generally practiced.

These facts are, of course, largely self-evident. They are widely and generally followed through the establishment of maximum and minimum stock limits. Such limits are subject to variability, being based, as before indicated, on a study of consumption. Their accuracy, as originally fixed or as revised from time to time to meet changing conditions, is, therefore, to a large extent a matter of judgment, such judgment being tempered by considerations both of past performance and anticipated demand.

With the idea of attempting to arrive at a more accurate basis of stores operation, an extended and detailed study has been made of stock control in the research department of a large technical organization. The storerooms supplying the Research Department of Bell Telephone Laboratories, Incorporated, carry between 2,000 and 3,000 items of stock, including such diverse material as laboratory apparatus, chemical supplies, piece parts of communication equipment, hardware, stationery, and other materials required for laboratory operation.

In an effort to establish a system which would give a predetermined amount of protection to the stock items and allow a simplified determination both of the amount of stock to be carried and of the number of stock reorders per year, a system of stock control has been developed in which these matters are specifically cared for. Since these storerooms present problems common to all large storerooms both as to the number of items carried and as to the type of demands which they must meet, the study of these problems has yielded results which are widely applicable.

I

Stock items are grouped for consideration into three classes, based upon variation in demand, as follows:

A. Where the future demands are known;

B. Where daily demands fluctuate between certain definite limits depending upon the number of independent requests per day for an article, the limits changing from time to time as the general demand for the article changes;

C. Where demands for stock are intermittent and cannot be accurately estimated beforehand.

Class A stock, where the demand is known beforehand, is the simplest to handle because definite schedules can be established to govern the movements of stock material.

The control of Class B stock is a more difficult problem, requiring judgment based on past experience. It is found as the result of a statistical study, however, that even though conditions change, the variations in demand over one period due to the number of independent requests received per day are within limits sufficiently definite to predict the demands which will be made during the succeeding period. Consequently, it is generally possible from past records to estimate future demands and to set maximum and minimum stock limits in this way. It is upon his knowledge of past operation, as a result of long experience with the stock he is handling, that a storekeeper bases his judgment in estimating future demands. In larger storerooms, a special department is organized to do this work, the skill of which is reflected in the efficiency of operation of the storeroom. The work consists in setting, for each item, minimum stock limits which protect the storeroom from running out of stock, and maximum stock limits which control the amount of stock carried. The problem, then, in the treatment of Class B stock resolves itself into that of finding a system from which maximum and minimum stock limits can be established for each item in terms of past performances.

In considering these two factors it should be noted that the term "minimum stock," as commonly used, refers to the stock on hand at the time new stock should be ordered. Obviously, this is not the actual minimum amount of stock in the storeroom, for the stock will continue to diminish until the new supply is received. To avoid confusion in this respect we have, throughout this article, called that amount of stock at which a new supply should be ordered the "ordering point." We have also avoided the use of the term "maximum stock," which may be similarly ambiguous, and have introduced the term "ordering amount." In operation, when the supply of an item has decreased to its "ordering point," an order is placed for its predetermined "ordering amount."

The ordering point for an item is dependent upon the expected lapse of time between the placing of the order and the arrival of the supply. For convenience, we shall indicate this lapse of time by t and call it the restocking time. During the time t there will be an average withdrawal of an amount wt where w is defined as the average daily withdrawal. As a reserve supply, it is desirable to provide for a certain number of days' (d) supply in addition to the expected withdrawals wt. This reserve wd we call the "marginal stock," because it is the average quantity of stock on hand when a fresh supply of stock is received. The ordering point is reached, therefore, when the supply has fallen to an amount $wt + wd$. If d is kept the same for all items, then during a reasonable period, say six months or a year, the percentage of unfilled requests for a group consisting of a large number of items having a common value of t is the same as for another group having a different value of t.

This conclusion is based on a statistical study of the withdrawals made during the restocking times for hundreds of different items of Class B stock, having a wide variety of values

of w and t and subjected to variable demands. The accumulative values of these withdrawals, in terms of w, were plotted against the average restocking time, t, for each item. From the graph so obtained, it was found that ordering points of the form $wt + wd$, where d is a constant, would result in uniform protection against running out of stock, that is, the same percentage out-of-stock condition would be obtained at each value of t. The study also established a value of 12 as the economical upper limit for d.

This gives the ordering point any value between wt and $w(t + 12)$, and in practice it is desirable to decide upon one value for all items in the storeroom, or for each class of stock if it is necessary to divide the stock into classes, and apply the selected value to each item.

If the ordering amount is set so that the same number of days' supply of stock is carried on the average for similar stock items, it will be shown later that the ordering amount is the quantity

$$2(\text{average stock} - wd).$$

For example, if it is decided to carry, on the average, 60 days' supply for a given class of stock, the ordering amount will be

$$2(60w - wd)$$
$$= 2w(60 - d)$$

If the ordering amount is set at this quantity for each item of stock, then the average total stock of the storeroom will be maintained at 60 days' supply.

Where necessary, the various items of stock can be divided into classes, each of which carries, on the average, the same number of days' supply of stock and requires the same protection.

With the ordering amounts and ordering points fixed according to this definite plan, other factors, such as the

Chart I

COMPARATIVE TEST OF STOREROOM OPERATION UNDER OLD AND NEW SYSTEMS

OPERATING FACTORS	OLD SYSTEM	NEW SYSTEM (SUBSTITUTED)			
	ACTUAL	PREDICTED	ACTUAL	PREDICTED	ACTUAL
AVERAGE OPERATING STOCK	86w	75w	75w	60w	63w
NUMBER OF TIMES OUT OF STOCK	66	67	69	89	78
NUMBER OF STOCK REORDERS	169	140	159	182	190

number of stock reorders per year and the number of times out of stock, are known in advance. Consequently, many advantages in operation and control are achieved with little change in standard storeroom practices and routines.

II

It is obvious that Class A stock can be controlled by this same method, since the future demands are known, and w, t and d are also known. Class C stock can also be treated in the same way as Class B stock, using the best estimates of w, t and d, based upon whatever past records are available. The new method, therefore, is generally applicable to all stock items.

Before actually changing the stock limits, it is possible to make a test which will demonstrate the effectiveness of the new method. From the records of the storerooms it is a simple matter to determine the average daily withdrawal (w) and the restocking time (t) of each item of stock and from these the ordering points and ordering amounts. This was done from the 1924 records, taking $d=12$, and the average operating stock at 60 days' supply and 75 days' supply. Suppose we had introduced the system at the beginning of 1925; then the quantities of ordering point and ordering amount obtained for each item from the 1924 records would have been used to control stock. The old system was in use, however, and the continuous inventory records are available showing the withdrawals, the number of stock reorders, and the percentage out of stock for 1925. It was a simple matter to introduce into these records the 1924 quantities of ordering point and ordering amount for each item, instead of the maximum and minimum stock limits used, and, by using the withdrawals which occurred in practice, to check the number of times out of stock and the number of stock reorders just as if the new system had been introduced. The results gave a direct comparison between the two systems. On the one hand, the stock maintenance department used its best judgment in anticipating demands, while on the other hand, under the new system, a simple routine was followed; the ordering point and ordering amount for each item were changed only after the records indicated that such a change was necessary, and no attempt was made to anticipate demands.

The result of the test is shown in Chart I. There was as close an agreement as could be expected between the predicted results and the actual results under the new system, particularly as 25% of the stock items considered were Class C stock. As anticipated, for about the same number of times out of stock the new system operated with a smaller average stock ($75w$ instead of $86w$) and with a fewer number of stock reorders (159 instead of 169). For the same average operating stock as that under the old system ($86w$), it can be predicted that the new system would be 58 times out of stock and there would be 118 stock reorders, as compared with the actual figures of 66 and 169 respectively under the old system.

The results of the test illustrate two main features of the new system: the storeroom operates very efficiently under routine control, and the operating factors of the storeroom can be predicted in advance.

Before discussing the method of installing and operating the new system in the storerooms, it will be well to consider the amount of average stock to carry and the reasons for carrying the

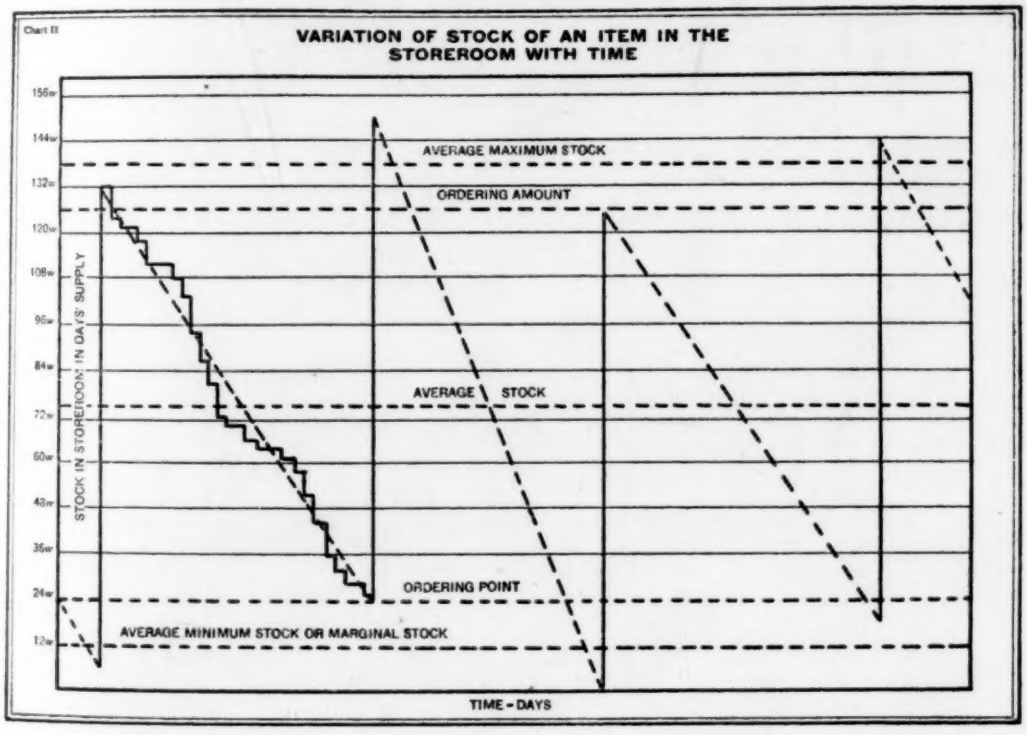
same number of days' supply for similar stock items.

III. Average Stock

The control of average stock is very important. Under the new system, the same number of days' supply is carried on the average for each stock item. For example, if the average stock of a given item is 150 and 2 are drawn out per day, and the average stock of another item is 750 and 10 are drawn out per day, then the average stock is the same number of days' supply in both cases—that is, 75 days' supply. This we call "operation on the principle of constancy of average operating stock."

This principle forms a basis for maintaining a relationship between the stock of each item and the stock of all other items and so leads to a definite control of stock, with its many advantages, one of which is that the amount of stock to carry can be determined in advance. Likewise the stock of any one item bears the correct relationship to the total stock of the storeroom, being based upon the demands for this item. Thus the stock carried is also easily associated with the credit system upon which the stock is purchased. If 60 days' credit is allowed on a given item and 60 days' stock is the average amount carried, then, obviously, the interest on the stock investment is negligible, because the stock is in operation or sold just before it is paid for.

Now, consider the amount of average stock to carry. It should be as small as possible on account of the investment and the space occupied; but there are certain limits beyond which it cannot be efficiently reduced because of the cost of replacing stock and because of the danger of being out of stock too often. In a modern storeroom the average stock has usually been reduced to a



working minimum as determined by these factors and therefore is a practical quantity of stock to use under the new system. It can be determined at inventory time, expressed in terms of the number of days' supply, by dividing the inventory stock of each item by the average daily withdrawal and averaging the amounts thus obtained. Should this average amount be $75w$, for example, then we can say that on the average there is 75 days' supply carried in the storeroom. This figure can be used as the average stock under the new system. It can be reduced after a few months if the operating conditions of the storeroom are better than desired.

The use of a common amount of average operating stock for all items in a storeroom is satisfactory when stock is of a uniform nature and is subject to about the same variations in withdrawals and restocking times, but when the items of stock differ widely in type, it may be necessary to select a few general classes of stock and assign each item to the class which represents the best operating conditions for that item. For example, four such classes of stock might be selected, as follows:

CLASS 1. *Material:*
- (*a*) Bulky
- or (*b*) Expensive
- or (*c*) Small credit allowance

Operating Conditions:
- (*d*) Protection against running out of stock only moderately important
- or (*e*) Withdrawals and restocking times vary moderately

With stock of this type the average storeroom would find the following factors satisfactory:

Operating Factors:
Average stock = 45 days' supply = $45w$
Ordering point = $w(t + 6)$

CLASS 2. *Material:*
Similar to that of Class 1

Operating Conditions:
- (*d*) Protection important
- or (*e*) Withdrawals and restocking times vary considerably

Operating Factors:
Average stock = $45w$
Ordering point = $w(t + 12)$

CLASS 3. *Material:*
- (*a*) Not bulky
- or (*b*) Inexpensive
- or (*c*) Long credit allowance

Operating Conditions:
- (*d*) Protection moderately important
- or (*e*) Withdrawals and restocking times vary moderately

Operating Factors:
Average stock = $75w$
Ordering point = $w(t + 6)$

CLASS 4. *Material:*
Similar to that of Class 3

Operating Conditions:
- (*d*) Protection important
- or (*e*) Withdrawals and stock reordering times vary considerably

Operating Factors:
Average stock = $75w$
Ordering point = $w(t + 12)$

The determination of the ordering point and the selection of the average amount of stock to carry automatically set the amount of stock to order when the ordering point is reached. We have called this quantity of stock the "ordering amount."

IV. Ordering Amount

The ordering amount is definitely set so that it governs the average stock inventory.

By definition, for all storerooms where the withdrawals are fairly uniform with time,

$$\text{Average stock} = \frac{\text{Maximum stock} + \text{minimum stock}}{2}, \quad (1)$$

Chart III

Chart for determining Ordering Points (O.P.) and Ordering Amounts (O.A.) for storerooms where withdrawals and restocking times vary considerably and the average stock is 75 days' supply (75w)

ORDERING AMOUNTS = 126 ω

ω =	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5
O. A.	126	189	252	315	378	441	504	567	630	693	756	819	882	945	1008	1071	1134	1197

ORDERING POINTS = ω(t + 12)

	ω =	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5
t																			
1		13	20	26	33	39	46	52	59	65	72	78	85	91	98	104	111	117	124
2		14	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133
3		15	23	30	38	45	53	60	68	75	83	90	98	105	113	120	128	135	143
4		16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144	152
5		17	26	34	43	51	60	68	77	85	94	102	111	119	128	136	145	153	162
6		18	27	36	45	54	63	72	81	90	99	108	117	126	135	144	153	162	171
7		19	29	38	48	57	67	76	86	95	105	114	124	133	143	152	162	171	181
8		20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190
9		21	32	42	53	63	74	84	95	105	116	126	137	147	158	168	179	189	200
10		22	33	44	55	66	70	88	99	110	121	132	143	154	165	176	187	198	209
11		23	35	46	58	69	81	92	104	115	127	138	150	161	173	184	196	207	219
12		24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228
13		25	38	50	63	75	88	100	113	125	138	150	163	175	188	200	213	225	238
14		26	39	52	65	78	91	104	117	130	143	156	169	182	195	208	221	234	247
15		27	41	54	68	81	95	108	122	135	149	162	176	189	203	216	230	243	257
16		28	42	56	70	84	98	112	126	140	154	168	182	196	210	224	238	252	266
17		29	44	58	73	87	102	116	131	145	160	174	189	203	218	232	247	261	276
18		30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285
19		31	47	62	78	93	109	124	140	155	171	186	202	217	233	248	264	279	295
20		32	48	64	80	96	112	128	144	160	176	192	208	224	240	256	272	288	304
21		33	50	66	83	99	116	132	149	165	182	198	215	231	248	264	281	297	314
22		34	51	68	85	102	119	136	153	170	187	204	221	238	255	272	289	306	323
23		35	53	70	88	105	123	140	158	175	193	210	228	245	263	280	298	315	333
24		36	54	72	90	108	126	144	162	180	198	216	234	252	270	288	306	324	342
25		37	56	74	93	111	130	148	167	185	204	222	241	259	278	296	315	333	352
26		38	57	76	95	114	133	152	171	190	209	228	247	266	285	304	323	342	361
27		39	59	78	98	117	137	156	176	195	215	234	254	273	293	312	332	351	371
28		40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380
29		41	62	82	103	123	144	164	185	205	226	246	267	287	308	328	349	369	390
30		42	63	84	105	126	147	168	189	210	231	252	273	294	315	336	357	378	399
31		43	65	86	108	129	151	172	194	215	237	258	280	301	323	344	366	387	409
32		44	66	88	110	132	154	176	198	220	242	264	286	308	330	352	374	396	418
33		45	68	90	113	135	158	180	203	225	248	270	293	315	338	360	383	405	428
34		46	69	92	115	138	161	184	207	230	253	276	299	322	345	368	391	414	437
35		47	71	94	118	141	165	188	212	235	259	282	306	329	353	376	400	423	447

ω = Average daily withdrawal of each item.

t = Restocking time (days) of same item.

On this chart values for ω less than 1.0 or greater than 9.5 are obtained by moving the decimal point.

where these quantities are the actual average maximum and minimum stock figures and not the ordering point and ordering amount (Chart II). Using this same notation, it is seen from equation (1) that

$$\text{Maximum stock} = 2 \text{ average stock} - \text{minimum stock} \quad (2)$$

and, from Chart II,

$$\text{Ordering amount} = \text{maximum stock} - \text{minimum stock.} \quad (3)$$

Therefore, substituting (2) in (3)

$$\begin{aligned}\text{Ordering amount} &= 2 \text{ average stock} - 2 \text{ minimum stock} \\ &= 2(\text{average stock} - \text{minimum stock}) \\ &= 2(\text{average stock} - \text{marginal stock}),\end{aligned}$$

since by definition the actual minimum stock is what we have called the marginal stock.

As an example, consider Class 4 stock, page 202, where the average stock is $75w$ and the marginal stock is $12w$; then

$$\begin{aligned}\text{Ordering amount} &= 2(75w - 12w) \\ &= 126w\end{aligned}$$

This means that when the ordering point $w(t + 12)$ is reached an amount of stock $126w$ is ordered. It is not necessary for the storekeeper to make this calculation from the formula, as the results can readily be expressed for his use in the form given in Chart III. For example: if, on the average, an item can be restocked in 10 days (t) and 5 are drawn out each day (w), then by inspection of this chart the storekeeper finds that the ordering point should be 110 and the ordering amount 630.

The ordering amount would naturally be modified slightly by purchasing conditions; for instance, if w is 1, so that the ordering amount is equal to 126 and the standard amount to purchase is one gross, then one gross of this item would be ordered.

Once the ordering amount is decided upon, the annual number of orders necessary to replenish stock is known in advance. For any item it is

$$\frac{\text{Total Yearly Withdrawal}}{\text{Ordering Amount}} = \frac{365w}{2w\left[\begin{array}{l}\text{number of days stock carried on the average} \\ - \text{number of days added for protection}\end{array}\right]}$$

It should be noted that w cancels in this equation, indicating that the number of orders placed per item per year is the same regardless of the size of the average daily withdrawal.

V. Installation and Operation

In introducing the new system in a storeroom, the quantity of average stock to carry and the ordering point limit to be used can be obtained as previously given. Then the values of w and t are determined for each item from the latest storeroom records. As new items are added, judgment must be used in deciding upon the best values of w and t for them. From then on, the recording of stock is for the most part a routine matter which requires only keeping a continuous inventory of each item and ordering the ordering amount when the ordering point is reached. Such a record can be kept on a card of the type shown in Chart IV. Occasionally there will be cases where the withdrawals will increase or diminish to such an extent that new limits of ordering amount and ordering point should be established. These, however, can also be handled in a routine way if the clerk will bring to the attention of the stock maintenance department those

cases where the monthly withdrawals have doubled or been reduced to one-half, or where an item is out of stock. The stock maintenance department can then decide whether the ordering point and ordering amount should be changed, or whether this is merely a temporary fluctuation. The system thus reduces the work of this department to the consideration of those items requiring judgment.

From the management view-point, the new system offers a method of close control. If the storeroom is out of stock too frequently, it is because the average stock or the ordering point limit is too low, and the one which is out of line can be increased. Inspection of the stock cards will show which one should be changed. Increasing the average stock reduces the out-of-stock condition proportionately but increases the investment. Raising the ordering point increases the marginal stock and consequently increases the number of stock reorders per year. In either case the cost of the change can be determined and the manager can decide whether the difference in service is worth the cost before taking any action.

In conclusion, the advantages of the system appear to be the following:

1. The average stock is maintained at a predetermined value.
2. The storeroom operates on a more routine basis.
3. In a given class of stock, the desired amount of protection against running out of stock is given to each item.
4. The annual number of orders replenishing stock is known in advance.
5. The amount of stock to carry can readily be associated with the credit system upon which the stock is furnished.
6. Complete control of the operation of the storeroom is obtained.

Chart IV

STOCK RECORD CARD

ORD. AMT. 144 ORD. PT. 18 No 7

DATE 1926	CODE	ENGINEER	RECEIVED	WITHDRAWN	BALANCE ON HAND	DATE 1926	CODE	ENGINEER	RECEIVED	WITHDRAWN	BALANCE ON HAND
1/15	Trans.	O.C.			50	5/1	11345	L.D.A.		8	143
3/31	30003	F.E.L.		3	47	5/2	11345	L.D.A.		4	139
4/1	11345	F.H.C.		2	45	5/3	12093	Buckley		2	137
4/1	14601	Panick		2	43	5/4	14601	Lyons		2	135
4/2	30003	R.H.		5	38	5/5	14600	Nelson		1	134
4/6	12093	Kopf		1	37	5/6	14600	K.L.C.		1	133
4/9	16916	Cook		9	28	5/7	14601	McH.		6	127
4/9	11345	J.E.F.		2	26	5/10	12093	Buckley		3	124
4/10	11345	J.A.R.		1	25	5/12	11345	L.D.A.		2	122
4/12	11345	J.E.F.		1	24	5/13	11345	Kincaid		2	120
4/12	12093	Buckley		1	23	5/14	11345	F.H.C.		1	119
4/13	14211	Hecht		2	21	5/19	31314	E.E.S.		1	118
4/15	30003	R.H.		4	17	5/24	33251	Hart		4	114
4/19	4C	N.S.	144		161	5/29	32694	K.J.G.		1	113
4/12	32311	Lacon		8	153	6/1	11345	L.D.A.		3	110
4/30	12093	J.B.H.		2	151	6/3	30003	R.H.		2	108

ITEM	CODE NO.	DESCRIPTION	LOCATION
JACKS	218-A		A-6

MONTHLY WITHDRAWALS—30W

YEAR	1925	1926	1927
JAN.	17	21	
FEB.	33	54	
MAR.	18	21	
APR.	35	40	
MAY	52	38	
JUNE	27		
JULY	52		
AUG.	10		
SEPT.	34		
OCT.	30		
NOV.	27		
DEC.	48		
TOTAL	423		

RESTOCKING TIME t

ORD.	REC'D	DAYS	ORD.	REC'D	DAYS
7/15/25	7/19	4			
7/24/26	7/26	2			
4/15	4/19	4			

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THE DEPARTMENTS OF THE HARVARD BUSINESS REVIEW

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SUMMARIES OF BUSINESS RESEARCH

TYPES OF INVESTMENT TRUST COLLATERAL AND SECURITIES[1]

THE introduction of the investment trust in this country has been one of the significant developments in post-war American finance. A variety of forms of the investment trust, showing all of the originality which is characteristic of any adoption in the United States of devices employed elsewhere, are now being tested here. The demonstrated usefulness of several of these forms gives promise of their growth into an integral part of our financial system.

It is the purpose of this study to point out the types of collateral held by the investment trusts as a basis for their own security issues, and to present the theories underlying the use of the various types of investment trust securities.

Definition of an Investment Trust

In defining an investment trust it is necessary to give some consideration to the meaning attached to the term in England and Scotland where the principal prototypes are found. The investment trust "is a financial institution dealing professionally in the investment of securities with due regard to diversification. It is generally in the form of a corporation or voluntary association issuing shares based upon holdings of various kinds of securities so as to afford the investor a high degree of safety through diversification."[2] In other words, four special characteristics stand out: "(1) it is an organization which secures capital by the sale of certificates, shares, or stocks and bonds; (2) it invests the funds so obtained in a wide variety of securities so that the law of averages may operate in protecting the portfolio; (3) it avoids controlling interests, and so limits its participation in any one security that directive and managerial control is avoided; and (4) it undertakes continuing supervision of the investment fund, on much the same principles as those which any conscientious trustee enjoying discretionary power should apply in caring for estates."[3]

In America these characteristics have been observed as a whole, but in some cases to a lesser extent than in Great Britain. For example, in America there is a tendency toward unchanging collateral. The management is less alert to take advantage of changing monetary and market conditions, and, therefore, holds less mobile investments. In other words, the management is more prone to look upon the collateral as a long-time investment, not to be changed frequently for the purpose of taking immediate speculative profits. Another American tendency is toward a smaller degree of diversification. Holdings are

[1] Adapted from a thesis by Curtis W. Childs in the course in Corporation Finance, Harvard Business School, January, 1926.

[2] Kilborne, Russel D., "American Investment Trusts," *Harvard Business Review*, Vol. III, p. 161.

[3] Robinson, L. R., *American Contributions in the Development of the Investment Trust.*

often limited to industries of the United States, and sometimes to a single industry. It is also noted that the American investment trust is likely to limit its security holdings to either stocks or bonds.

As stated in the definition, the true investment trust is organized for investment purposes only. It owes its existence to the need of the small investor for diversification and trained investment experience. A distinction must be drawn between it and the so-called "financing investment trusts" which are organized to acquire the majority or directive interests in, or to serve as the fiscal agent for, a variety of foreign enterprises. Authorized by the Edge Act, quite a few of these financing companies have been organized in the United States, effecting their diversification without confining themselves to purely investment activities. Among these are the United States and Foreign Securities Corporation, the American and Continental Corporation, and the American and Foreign Power Company. In the domestic field there are numerous examples of such "financing investment trusts," as Electric Investors, Incorporated, which is affiliated with the General Electric Company, and the North American Utility Securities Corporation. These companies do not come under the definition of an investment trust, as above, and are excluded from this study.

Analogous to these "financing corporations" are the popular holding companies, sometimes confused with investment trusts. With these the distinction is even clearer; holding companies are purely agents of the seller of capital, exerting control of the management, with no regard for diversification.

Types of Investment Trusts

Dr. L. R. Robinson has suggested that there are two types of investment trusts evolving in the United States today, differentiated upon the basis of the collateral which they hold. The first group holds a special, unchangeable collateral, which is kept in the hands of the trustees. This collateral is considered to be a permanent investment, and is similar to a joint holding, on the basis of which bankers' shares are issued. The holder of these shares has the option of withdrawing from the joint fund at any time and receiving the current pro-rata value of the collateral held, in exchange for his shares. In general it may be said that these bankers' shares offer very limited diversification, permit no opportunity for management of the investment fund, and are merely a convenient method of investing small sums of money.

The second group, on the other hand, holds general and changeable collateral on the basis of which distinct new securities are issued. Although fundamentally the shareholders have a joint ownership of the portfolio, technically (through their shareholdings) they are merely owners of the investment trust, which in turn holds the portfolio as its chief asset. This distinction may be made a little clearer when the withdrawal of a shareholder from this type of investment trust is considered. In event of withdrawal the shareholder is in the same position as the owner of common stock in a corporation. He must utilize the existing market by selling his shares to some prospective investor at the bid price. Usually the trustees act as brokers and take measures to create a market for the trust securities. It may also be said that the

trustees take an active part in the management of the collateral held, diversifying widely and shifting it according to their own investment theories. All in all, this group conforms more closely to the investment trust as defined. The two groups of investment trusts will now be treated separately in greater detail.

A. Investment Trusts Holding Unchangeable Collateral

The organizations holding special collateral are commonly called "investment trusts" by their promoters. The mistake is repeatedly made by American financial writers, bankers, and promoters of comparing these companies with British investment trusts; in reality they are based upon principles so different that they represent a distinct American development, and should be known by some other name to avoid confusion. Sometimes they are referred to as "issues of bankers' shares," and this designation seems to be more accurate.

Bankers' shares are certificates of deposit representing a certain block of securities held in trust by a bank for the benefit of the certificate holders. These blocks of securities cannot be substituted one for another, but the holder may present his certificate to the trustees at any time and receive the deposited securities represented by it. All dividends are paid out in full, and the profits of the trust are derived from the profit of the sale of bankers' shares.

The blocks or units represented by the certificates in each case consist of a designated number of shares in each of a selected group of companies. These companies are generally limited to one industry, and the securities purchased are usually restricted to shares of common stock. There is no management problem involved in the holding of these blocks of securities, for the investments are immobile and unchangeable in the hands of the trustees. Thus the services rendered by the trustees are nothing more than those of collecting the dividends on the deposited stocks, looking to conversion privileges and subscription rights, and paying all that accumulates in distributions to the shareholders, or those presenting coupons on the predetermined dividend dates.

Investment trusts issuing this type of bankers' shares comprise the United Bankers Oil, American Trustee Shares, Diversified Trustee Shares, and the Industrial Trustee Shares. Three similar companies, the United Chain Stores, Incorporated, the United Railways, Incorporated, and the United American Electric Companies, formed in the summer of 1924, were liquidated on March 26, 1926.

B. Investment Trusts Holding Changeable Collateral

The second group of investment trusts, holding general collateral, are more analogous to the British prototypes, and they constitute the real backbone of the investment trust development in America. This group issues irredeemable shares against a general mobilized collateral. Here the emphasis is placed upon the management of the portfolio, the basis of the management being some well-defined investment theory.

Some trusts diversify their investments widely, and purchase all types of securities (the International Securities Trust and the American Founders

Trust). Others emphasize prior lien securities (such as the Bond Investment Trust and the Bondshare Corporation). And still others emphasize investment in common stocks (the Massachusetts Investors Trust and the New England Investment Trust).

The differences in the methods of operating these trusts seem to point to three theories of investment: (1) active management of a varied portfolio, (2) bonds invested on a long-time basis, and (3) common stocks invested on a long-time basis. The differences in these three theories so affect the nature and management of the collateral that the types of trusts predicated on these theories will be treated individually. *All of these three types are subdivisions of the class of trusts holding general collateral.*

1. The Theory of Active Management

Investment trusts based upon the theory of active management of a varied portfolio realize their profits from the turnover in the investments held. The major part of the profit made on turnover is treated as income, but a certain proportion is segregated to accumulate reserves for contingencies, or used to "write down the cost of investments." The investment portfolio consists of bonds, preferred and common stock, highly diversified so that not more than 1% of all the investments may be in securities of any one issue, either government or private. Foreign as well as domestic securities may be held, and an attempt is made to forecast both national and international economic conditions. Domestic bonds are shifted to stock investments in periods of increasing prosperity. An effort is made to take advantage of world security markets in purchasing foreign issues so that a maximum appreciation may be realized. A scale of purchasing and liquidating securities is used so that the trust is always in a transitional stage from one market to another.

2. Bonds Invested on a Long-Time Basis

The second group of investment trusts holding general interchangeable collateral emphasizes the holding of bonds for a long-time investment. This is the old orthodox theory that more money is made in the long run by investing for safety of principal and certainty of income than by capitalizing other investment factors. In conformity with this theory, bonds should be purchased and held to maturity.

There is no absolutely accurate way of predicting cyclical movements in the bond market, and, therefore, no changes in the investment should be made unless the security behind a bond should decrease markedly in value. This method of investment minimizes risk by avoiding all market speculation. It requires only an accurate appraisal of the risk by the trustee at the time of purchasing the bonds, and subsequent attention to the credit standing of the borrowing companies. Trusts endorsing this theory are the Bond Investment Trust and the Bondshare Corporation.

Since this type of investment trust emphasizes safety of principal and certainty of income, only a slightly higher return can be expected than would be obtained by putting funds in a savings bank or in securities representing government obligations. Hence the appeal is limited primarily to the smaller investor whose limited knowledge and

funds lead him to desire the advantages of safety, diversification, and the services of competent trustees. The Massachusetts tax exemption feature adds an attraction for large investors in that state, and the same would hold true for other persons similarly situated in other states.

3. *Common Stocks Invested on a Long-Time Basis*

The third group of investment trusts of the general collateral type is that of trusts predicated on the theory of holding common stocks over a long period of time. This theory was demonstrated by E. L. Smith in his study entitled *Common Stock as a Long-Time Investment.* A share of common stock represents a portion of the ownership of a corporation. As the company prospers, the stockholder prospers accordingly, and he also benefits by gains which do not accrue to the holders of securities bearing a fixed income. Officials of corporations are usually large owners of common stock, as shown by the list of stockholders of the United States Steel Corporation; in addition, some 60,000 employees of this corporation own shares of common stock. Thus, the officers and employees of the corporations of the country are virtually partners, and are working for the interests of the common stockholders.

The increase in the wealth and population of the country is directly reflected in the increasing dividends and values of the common stock of representative corporations. Greater wealth and population provide wider markets, with consequent expansion and increased earnings. Another very important factor which is often overlooked is that the surplus earnings are put back into the business instead of being paid out in dividends. A well-managed company which pays $6 a share in dividends will generally leave $6 a share in the business after all prior charges are met. This $6 reinvested on a 6% compound interest basis will amount to $10.73 at the end of 10 years. If this procedure is followed every year for 40 years, a stock dividend of 80% could be paid on the original shares, to capitalize these accumulations; or the accumulated amount may be kept in the business to increase the equities of the common stockholders. Thus the common stockholder benefits directly by the following factors: (1) executive ability, (2) employees' interest and labor, (3) increasing wealth and population of the United States, and (4) surplus earnings put back into the business.

It should be borne in mind in conjunction with these factors that the common stock of today is not the common stock of previous years. More and more stress is being placed every year upon the responsibility and the obligation of the management toward the stabilization of dividends and the accumulation of ample reserves. Responsibility that was not in evidence in the days when common stock was more or less "water" and extremely speculative, is now recognized with regard to the broadening list of stockholders.

All stocks, it is argued, are not safe; all companies are not successful. The stockholder of a concern that has failed has little redress. This risk is taken care of by diversification of the holdings of the investment trust. The profits in stocks are so much greater than in bonds that a wide holding, applying the law of averages, will more than make up for any losses. Striking examples of this can be set forth. The common

stock of the American Radiator Company is worth 18 times as much today as it was 20 years ago. If, in 1905, 18 common stocks were selected, of which one was American Radiator, and 17 of them were worthless today, the appreciation of the American Radiator would have kept the principal intact.

The argument of the maintenance of purchasing power that can be obtained through a diversified common stock investment is also put forth. To insure security, an investment must not only be safe as to the repayment of the principal, but also as to the maintenance of the purchasing power of its return. Changes in commodity prices are constantly occurring with consequent fluctuations in the purchasing power of the dollar. One dollar invested today may not have the same purchasing power at the time of liquidation of the investment some years hence. In fact, over the period of the last 20 years, the rise in commodity prices has halved the value of the dollar in terms of purchasing power. Here the old economic theory can be applied that in times of rising prices the debtor suffers and the creditor gains. In other words, in times of rising prices and improving business the stockholders gain, and the bondholders, or debtors, are at a disadvantage. In times of falling prices the reverse is true.

Tests by E. L. Smith have shown, however, that even in times of falling prices the stockholder may not necessarily suffer, because with the steady growth of the country business does not suffer in proportion to the fall in prices. Thus, in the long run, the stockholder gains most, because his gain is greater in proportion than his loss. The study of Mr. Smith also shows that the stockholder enjoys a less variable real yield than the bondholder. In the period of study, from 1866 to 1923, the stockholder's real yield varied from 2.7% to 14.0%, or 5.2 fold, while the bondholder's real yield varied between 0.8% and 11.7% or 14.6 fold.

It is on this theory, of the purchase of common stocks for a long-time investment, that the Massachusetts Investors Trust, The New England Investment Trust, and Incorporated Investors, Incorporated, were organized.

Conclusion

As for the future of these various types of investment trust and the various investment theories which they individually sponsor, time alone will tell. Experience has shown in other fields that an institution which has met with unqualified success in foreign lands will not necessarily prove successful in this country; the movement is too recent to justify a forecast at this time. Undoubtedly each type and each theory will have its adherents, just as few men of financial means hold identically the same general theories of investment. Probably each will succeed to a greater or less degree by virtue of this fact, without at the same time casting any reflections on the soundness of the opposing theory.

ACCOUNTING BY TABULATING MACHINES[1]

II. Economy and Efficiency of the Tabulating Method

THE problem of evaluating the efficiency and the economy of the tabulating-machine method as applied to accounting is extremely difficult, because none of the companies visited really knew the costs of the operations which the installation of the tabulating-machine equipment had displaced. Although most industrial organizations know their total office expense, few of them analyze it down into the cost of the component operations.

The problem is further complicated by the fact that none of the companies visited took off from the tabulating machines exactly the same kind of information that had previously been gathered by hand. Accordingly, no conclusions can be given as to the absolute economy of the tabulating-machine method as compared with the ordinary method of handling accounting work.

Cost of Accounting by Tabulating Machines

To assemble the cost of a given tabulating-machine installation it is necessary to know the average wages paid to clerks of the requisite ability and the rental of the machines required. The average productivity of workers and machines may be determined or may be taken from the following summary:

Operation	Rated Machine Speed (Cards Per Hour)	Average Actual Speed Realized (Cards Per Hour)
Sorting (single column) Vertical Sorter	15,000	11,000
Horizontal Sorter	24,000	20,000
Tabulating	9,000	6,000

If 45 columns are punched on the electric key punch, a capacity of 360 to 400 cards per hour per operator may be expected; with fewer columns there will be a slight increase in speed.

Stop-carding by hand can be done at the rate of about 600 stop cards per hour.

The amount of attention for the various machines may be estimated as follows: For a regular or automatic tabulator a clerk is required in constant attendance to copy the totals shown on the counters and to start the machine after each total. One clerk can operate two sorters running simultaneously, two or three automatic printing tabulators, or one automatic printing tabulator and one sorter.

An estimate of the cost of a given procedure can then be built up as follows:

xxx,xxx cards per month @ $x.xx a thousand ..... $xxx.xx

Punching: xxx,xxx cards @ 350 an hour—xxxx hrs. @ xx cents an hour for operators ..... xxx.xx

Preparation:
- xxx hours coding @ xx cents an hour $xx.xx
- xxx hours adding @ xx cents an hour xx.xx
- xxx hours verifying @ xx cents an hour ..... xx.xx

xx.xx

Machine attendance and rental:
- xxx,xxx cards put through 15 sorts equals x,xxx,xxx cards; at 11,000 per hour (or 20,000) equals xxx hours on sorter @ xx cents ..... xx.xx
- xxx,xxx cards tabulated 4 times equals xxx,xxx cards; at 6,000 per hour

[1] Editorial Note: The first part of this article appeared in the October, 1926, number.

equals xxx hours; at xx cents an hour.....	xx.xx
xxx clerical hours in attendance @ xx cents.....	xxx.xx
Depreciation and maintenance on office equipment, such as adding machines, and so forth	xx.xx
Proportionate idle-time charge for rental of equipment and attendance	xx.xx
Miscellaneous burden charges	xx.xx
Total monthly cost for given procedure	$x,xxx.xx

With a little care, therefore, it is not a difficult problem to measure or estimate the cost of a tabulating-machine installation. The real difficulty lies in arriving at costs of doing the same operations by hand.

Cost of a Regular Accounting Department

The chief item of cost in a regular accounting department is the labor factor. In order to get the cost of a regular accounting department comparable to the cost of the tabulating equipment, however, it is necessary to know how much labor is necessary—not for the entire cost or accounting department, but for handling a given piece of work —such as pay-roll accumulation, pay-roll distribution, accumulation of material charges, care of balance-of-stores cards, and so forth.

In addition to labor costs there are equipment costs for the accounting, adding, and calculating machines used. Ordinarily, these costs will be in the form of depreciation costs on purchased equipment rather than rentals.

The Comparative Products

Assuming that it is desired to compare the tabulating-machine method with the ordinary accounting method, costs should be accumulated for similar procedures used to arrive at similar results. The difficulty arises in the fact that the accounting procedure most efficient for use on tabulating machines may well be different from the most efficient methods for getting the same results by hand. But in such a case, typical of almost all situations, the costs of two methods are not comparable.

The reports resulting from the tabulating-machine procedure are different from the ordinary hand-prepared accounting reports. These differences must be evaluated. For example, the increased speed with which reports may be turned out by the tabulating method must be considered.

Accordingly, in comparing costs, the products of the two methods cannot be assumed to be entirely similar. For this reason, even though the expense of the tabulating system may be greater than that of the ordinary accounting procedure, the difference may be more than made up in the value of the increased speed, accuracy, legibility, flexibility, or ease of operation.

Analysis of Tabulating-Machine Costs

On first analysis it would seem that a single use of a punched card is uneconomical. Undoubtedly a group of ordinary job tickets already extended can be added up more quickly on an adding machine by a clerk than can the same group be punched on cards and run through a tabulator. The speed with which it is possible to sort and tabulate by machine would seem to indicate that the economies increase with the number of different uses to which a card is put.

But the economy of the system is not necessarily a function of the number of sorts and tabulations. Although it is

probably quicker to add a total or post a figure by hand than to punch a card, sort it, and tabulate it, there are situations, once the system is installed, where there is a distinct economy in punching a card for a single sort or tabulation.

Thus, the whole procedure of master-carding is based on the saving of time by punching a single master card for a number of detail cards, and tabulating the master card, rather than retabulating the detail cards.

There is another phase to the general question of efficiency of the tabulating system. This concerns what may be termed the load factor of the tabulating-machine installation. From the nature of the tabulating procedure, operations must be performed in a certain order or succession. Often a certain sort or report is necessary before another sort or report can be made. Accordingly, the work cannot, in many cases, be spread out over the idle time of the equipment. This fact generally causes a monthly peak, for most control and accounting data are desired in at least monthly summarizations. As a result there may be a large amount of idle time on the machines in the middle of the month. In such cases it is often an economical procedure to do extra work on the machines during the quiet period in order to cut down on month-end work.

In any installation, the big difficulty is in getting a coordination between a balanced machine installation and a balanced statistical or accounting system. In arriving at such a coordination it may be wise to put a phase of accounting or statistics on the machines which itself can be done more efficiently by hand but which will serve to occupy what would be otherwise idle time on the machines. For example, it may be found that the tabulating machines in a given company save considerable sums in handling pay-roll and labor costs, but that these two procedures do not require the full month's capacity—merely taking the month-end capacity. In such a situation it might be wise, for example, to put accounts receivable on the machines if the major portion of the labor on this phase of the work may be arranged to occupy the middle of the month, in spite of the fact that accounts receivable for the particular company may, perhaps, be posted more quickly by hand than they can be punched and sorted into a file.

Accordingly, it will be realized that the advisability of the installation of the equipment in any given case is a problem requiring careful study and analysis. A brief statement of the advantages and disadvantages of the tabulating-machine method may be of aid in solving this problem.

Advantages of Tabulating-Machine Method

The tabulating-machine method is extremely flexible. As cost systems are used more and more for control purposes, executives find themselves in need of certain types of reports for limited periods only. For illustration, overhead may seem excessive in a certain department; the executives may want a detailed report of all items entering the overhead of that department, but will want such reports for only a limited time—until the difficulty is corrected. Once this problem is solved, reports giving detailed items of overhead on that department are no longer needed. But a new problem has probably come to the fore by this time, and a different series of reports may be required. Where an accounting system

is the medium from which such reports can naturally be gathered, the tabulating-machine method offers considerable advantages. Once the cards have been punched, they may be sorted and resorted to give almost any possible combination of information at a very small expense. They constitute a liquid reservoir of information which can be easily and rapidly tapped for any specific information desired. With the ordinary cost-accounting system, these special reports must be assembled by hand—a laborious process. The result is often that the cost of a special report is so high that the information is never assembled, although it would be of considerable value. The flexibility of the tabulating-machine method is one of its outstanding advantages.

The speed with which cards may be handled, once they are prepared and punched, often makes it feasible to exert a much closer control over various activities of the business if the tabulating-machine method is used than if it is not used. For example, the ordinary firm does not check the detailed balance-of-stores card against its ledger inventory accounts very often, because the procedure necessary is rather involved and expensive. If the stores files are kept with tabulating cards, however, the ease of getting a total of the entire file makes a very frequent check feasible. Accordingly, a much closer control can be exercised. Discrepancies cannot mount into the tens of thousands of dollars before they are found.

Where the time element is of any consequence, the tabulating equipment offers definite advantages. If a complex monthly report is more valuable to executives on the 3rd than on the 15th of the month, then the tabulating method may well be used. The speed of the machines is one of their chief assets.

Wherever there is a large business, there is pretty certain to be a great complexity of necessary detail. The tabulating system is particularly adapted to the automatic and accurate handling of a mass of detail which is likely to become confusing or numbing to clerks, to the extent of causing considerable inaccuracy. It would seem, therefore, that the tabulating method is generally better adapted to the large company than to the small business. The smaller the company, the wider must be the application in order to render the installation efficient. It must not be understood, however, that all large companies can use it effectively.

Wherever there is a requirement for accounting reports which represent collations—the assembling of details from several sources—it is generally found that the machines can perform such sorting and assembling much more efficiently than can clerks, sorting, adding, and posting by hand.

One of the auxiliary advantages of the tabulating-machine method is the fact that it is possible to get reports which are automatically printed by the machines. Accounting reports often have to be typewritten before they are presentable.

Finally, once the accuracy of the cards has been proved, the accuracy of all resulting reports is sure to be very high. Where hand methods prevail, each operation must be checked; and even then, the human element always permits errors to creep in. To the extent that a single verification of the cards at the time of punching practically insures accuracy in all future uses of the cards, the value of the automatic machine over the fallible human being is clear.

Balancing some of these advantages, there are some drawbacks to the tabulating-machine method which should be pointed out.

Disadvantages of the Tabulating-Machine Method

It was just stated that one of the advantages of the system is that, granted cards are once checked, future reports taken from them can be depended upon as being accurate. The difficulty, however, comes in the expense of achieving this primary accuracy. For statistical purposes, perhaps, 98% accuracy will suffice; this degree can be attained without too great expense. But for accounting purposes, accuracy must be 100%. The extra 2%, or so, of accuracy is expensive. If cards are put to more than one use, this original expense, like that of punching, is, of course, spread out.

One objection that the tabulating-machine method is likely to encounter is the fact that it is at present unusual. Where it is used for accounting records, the invisibility of the information is often considered a serious drawback, particularly to the old school of accountants and managers who are accustomed to seeing things in "the books" of the company. Laborers and foremen are also likely to be opposed to the system because to them it appears as so much red tape—chiefly because it is not understood. It would be most unwise to install a tabulating-machine system without first winning the cooperation of the organization as a whole. It cannot be foisted upon the business and be expected to succeed.

One of the factors that arouses opposition is the necessity of coding; the descriptive information is beclouded. Often executives are to be blamed, because codes are very clumsily arranged. Whenever the tabulating method is installed, its development should be planned into the future, and codes should be set up which will permit a rounded development rather than a patchwork expansion.

Too often, after the tabulating system is installed, it becomes an addition to present methods rather than a substitute for present procedures. At first such a situation may be necessary; but as soon as the ability of the machines is demonstrated, parallel information should not be gathered by hand. From another standpoint also the system may be too much an "addition" or appendage. Where accounting is done on the machines, the machines cannot merely be superimposed on the existing accounting system and be expected to function efficiently. The existing accounting system should be modified to suit the needs of the tabulating machines.

Physically there are some difficulties which are likely to be experienced. The machines are somewhat delicate mechanisms subject, like all machinery, to breakdowns. For companies located at a distance from service centers, some inconvenience may be experienced. This inconvenience is often exaggerated by the failure of the machines at times of peak loads.

As explained above, one of the definite disadvantages of the machines is the fact that in emergencies the output cannot be increased beyond a certain point. Where accounting is done by hand, in case of a jam, extra clerks can be transferred to the job from other work to hasten things; with the tabulating machines, what is needed is more machines—not more clerks—and they cannot be had on the spur of the moment,

The ease with which detailed information can be assembled and printed on the machines is likely to lead to multiplicity and complexity of reports. Reports originally thought interesting may fall into comparative disuse, but may nevertheless be continued, because they are easily taken off. Some individual reports are likely to grow to proportions where they cannot be assimilated by any executive or group of executives. This difficulty is, of course, not inherent in the tabulating-machine method; but it takes a strong man to avoid the natural drift.

Finally, one word should be said in regard to the planning of installations. Often the machines are installed because of their efficiency in handling one phase of accounting procedure; at that time no plan is made for the further use or development of the machines. After familiarity with the work in hand is attained, the scope of the work is likely to grow naturally—but not in planned directions. Such sporadic growth is often unsound. It may represent an overdevelopment of one phase while other more important phases have not been touched. On the other hand, it may represent the extension of the machines to too broad a sphere with not enough concentration on any one problem during the expansion. Either situation leads to weakness. Installations should start on one phase and expand slowly; the direction of expansion should be predetermined.

Conclusion

The machines themselves are very interesting pieces of mechanism to watch. Just to see the tabulator take a group of cards, add some, stop, print a total, start itself again, add more, and so continue arouses admiration. The machines all "look" efficient. They have a very strong appeal to any one with a mechanical or engineering turn of mind. But this very fact should put one on his guard. Impressions are often deceiving—especially where there is a large amount of work behind the scenes—that is, before the cards come to the machines. Perhaps it is this factor which has led some companies to install the system precipitously without first determining relative costs; once it is in, it is impossible to determine former costs or even the exact type of information originally gathered.

Accordingly, it must be pointed out that any company about to install tabulating machines should investigate the proposition very thoroughly. Accounting can be handled efficiently by tabulating machines—but not all accounting for all companies. Each individual case must be analyzed on its merits.

Once the analysis has been made and estimates of cost compared, in so far as possible, with actual costs *for the same work* done by hand, the machines may be installed. Once the machines are installed, accurate data on their performance should be kept—especially in regard to the load factor. Comparisons should be made with former costs. Extensions of the original installation should be undertaken slowly, although the general direction of expansion should be determined before the first machine is installed. All codes should be drawn up with reference to the ultimate system planned for the future.

If these general methods of investigation, analysis, planning, and checks on performances are pursued, it is felt that where tabulating machines are fitted to handle the work and are properly installed, they will prove themselves a decided improvement over hand methods of accounting.

CASE STUDIES IN BUSINESS

SOME PROBLEMS IN JOINT COST

THE problems surrounding joint cost occupy a distinct place in the field of cost accounting. The subject has been frequently handled in its various aspects by men of standing in the profession,[1] but all the discussion which has hitherto been published points to the fact that, as in many other business problems, there are no general principles which can be laid down. Each case where the problem arises possesses certain unique features which necessitate its being handled purely on its own merits.

No attempt will be made here to delve into the theory of joint costs. The purpose of this discussion is to set forth a few situations where the problem arises, and to point out possible solutions based on the considerations of each case. It may be well to emphasize, at this stage, that in most cases there can be no accurate solution. Where there are two or more finished products, the result of a single chemical reaction or manufacturing process, in which it is impossible to distinguish the resultant elements until the completion of the process, the difficulties of determining how much of the joint costs are applicable to each become apparent. Any allocation of cost in most cases must be arbitrary; the problem, then, consists in making this allocation as reasonable and logical as possible, at the same time bearing in mind the information which is desired in connection with each product, the purposes of cost finding in the individual instance, and the expense and trouble which it is desirable to incur in arriving at fair and proper results.

Statement of Cases

The Vitex Chemical Company manufactured 20 major chemical products sold for commercial use, among them, muriatic acid and nitric acid. In the process for the production of muriatic acid, a by-product known as "salt cake" was obtained, the value of which was approximately 80% of the value of the muriatic acid produced. The exact percentage varied to some extent with the quality of the raw material which was used. Similarly, in the manufacture of nitric acid the chemical reaction resulted in the formation of "nitre cake," the value of which averaged only 2% of the value of the nitric acid.

The Crocker and Lang Veneer Company, on the other hand, manufactured veneer from high-grade lumber. In spite of careful selection of lumber, only 30% of the material in the logs purchased was satisfactory for veneer; the rest was sawed up and sold for lumber at ordinary lumber prices. Notwithstanding the fact that 70% of the raw material entering into the manufacturing process was converted into lumber, the value of this lumber, using the single log as a unit, averaged but 20% of the value of veneer produced.

The problem arising in each of these

[1] Professor Taussig theorizes on the subject of joint costs in the sixteenth chapter of his *Principles of Economics*, third edition revised. Professor Cole has an article in the July, 1923, issue of the *Harvard Business Review*, Vol. I, No. 4, in which he discusses the principles involved with their application to specific cases.

cases, stated simply, is what proportion of the material, labor, and overhead entering into each process shall be charged to each of the resultant products.

Some Methods of Accounting for Joint Cost

There is a great variety in methods of accounting for joint cost, many of which are but remotely applicable to the cases discussed here. It is our purpose to confine the discussion, for the sake of simplicity, to those methods that suggest themselves, which, for one reason or another, seem most adapted to the situations outlined above. As stated before, the intention is to avoid a philosophical discourse on the theory of joint cost.

1. Perhaps the simplest way of handling the costs of two joint products is to avoid dividing the joint cost and to allocate it presumably on an equitable basis. By this method a cost is obtained for one of the products, assuming that there are only two, by deducting from the total cost the selling price less selling and handling charges of the other product. This method is practical only where the value of one product is a nearly insignificant proportion of the value of the other. The chief argument in its favor, in such a case, is that it hardly pays to obtain cost figures for the unimportant by-product, the value of which amounts to so little. But the disadvantages are many. For example, the resultant cost of the main product, obtained by this means, will vary: first, as the selling price of the by-product varies; second, as the amount of the by-product gleaned from the process varies in proportion to the main product. For illustration, imagine a situation where the demand for the main product increases rapidly in the commercial world at large, while the demand for the by-product remains relatively constant. As the demand for the main product grows, the price will rise with a resulting increase in production. The increased output of the main product is accompanied by an increased supply of the by-product, since they both are necessary results of the same process. But there is no increased demand for the by-product to offset the larger supply; the price of the by-product accordingly drops, and the amount deducted from the total cost of the process to obtain a cost for the main product becomes smaller. Inversely, the cost of the main product, determined by this method, rises.

The introduction of too many variables in the costs of a commodity destroys the value of these costs. In comparisons between successive periods, it is impossible, without a maze of detailed analysis, to assign any rise or fall in the cost figures to the proper causes. The relative efficiency of the plant, for one period as against another, is a desirable thing to know. This method makes it impossible to obtain accurate comparisons.

2. A second method which suggests itself is that of charging in the raw material, labor, and overhead costs to each product in proportion to the selling value of the finished products. Although this system is purely arbitrary, it does furnish a cost figure for each product, however accurate or inaccurate it may be. Herein lies the chief advantage over the preceding method. Once the process has been completed, the selling and handling expenses of each product, of course, would be borne directly and solely by the individual products. This method, however, is open

to the same criticism as the first method regarding variable costs, in that any change in the selling value of either product or any change in the proportion of one product in its relation to the other would affect the costs of both. The difficulty, in each case, could be partially eliminated by the use of standard or average values and proportions for the purpose of allocating costs, such standards to be revised perhaps once a year, or more often, if the fluctuations were erratic and the results correspondingly inaccurate. The use of standards necessarily calls for a greater amount of cost work and computation than a simpler method would demand.

3. A third method is that of allocating labor and burden costs incurred for the products jointly in the same proportion as the value of raw material going into one product bears to the value of the raw material going into the other. This system obviously is applicable only to a situation where it is possible to measure the amount of raw material consumed in the manufacture of each product. Most chemical processes are ruled out by this condition, since the raw material undergoes a complete "chemical" change to produce the desired products. As a matter of fact, the method is seldom applicable, since in the majority of joint cost problems it is impossible to identify in any way the products until the conclusion of the manufacturing process.[2]

This method, like the second, is arbitrary. The proportion of raw material may have no connection with what may be termed a "fair" cost for each product. One product, the value of which may be twice that of the other, might consume only one-half the total amount of raw material. An enormous profit would be shown on this product, if labor and burden were allocated in this manner, while the other product would be sold at a loss.

4. Frequently, where a process results in the production of a single main product and one or more by-products, the allocation of costs by any of the methods outlined above results in the by-product, or by-products, being sold at a considerable loss. The reason for this is that these same by-products are themselves main products in another process, conducted by other companies, which, from the point of view of the by-products, is commercially more economical and efficient. These other companies, on the basis of their costs, and because of their larger production of the commodity, establish the market for that product. The original company, in whose process this commodity is only a by-product, is forced to sell at the established market price in order to dispose of its supply.

The Crocker and Lang Veneer Company is in just this situation. The by-product lumber is produced out of logs which cost from $50 to $60 per thousand feet, while the lumber of companies which manufacture lumber solely is produced from logs costing perhaps only $20 per thousand feet. One method of handling this joint cost problem is to charge the lumber resulting from the veneer and lumber operations with raw material at the price which the company would be forced to pay were it purchasing logs solely for the purpose of making lumber. Suppose, for example, that logs suitable for mahogany lumber might be purchased for $50 per thousand feet, while logs of a higher grade, suitable for veneer, are

[2] The Crocker and Lang Veneer Company case is an outstanding example of the exception to this statement.

worth $100 per thousand. If 700 feet out of a thousand, or seven-tenths, are sawed into lumber, the raw material charge to lumber operations would be for 700 feet at the rate of $50 per thousand. The other $50 per thousand, ordinarily chargeable to the lumber on a straight percentage basis, would be loaded on the veneer. Thus veneer would bear the cost, at $100 per thousand, for the 30% of raw material which goes into veneer, plus $50 per thousand for the 70% which goes into lumber.[3] Joint labor and burden costs would be borne by each in the same proportion. Like the third method, however, this system is of narrow applicability, since the conditions under which it may be applied exist relatively seldom in the commercial world. A further disadvantage is the fact that it is difficult to determine at any one time what the market price is for raw material of a quality necessary to produce the grade of by-product which the company produces.

The method, on the other hand, has this advantage. With the raw material going into the manufacture of the by-product charged in at approximately the same rate as that of competitors in this field, the company has a basis on which to compare the efficiency of its by-product operations (measured in terms of labor and overhead) with relation to competitors in this line. In other words, if the company finds itself making a substantial profit on its by-product, with costs computed as above, it can safely assume that, as far as the by-product is concerned, the manufacturing plant is operating economically. This factor, of course, is proportionately of greater importance the greater the value of the finished by-product or by-products, in relation to the main product. It is particularly vital, where a large expense is incurred in handling and perfecting the by-product, once segregated from the main product. The accurate tabulation of these costs would be of little value for comparative purposes, if those costs incurred jointly with the main product were not allocated in a manner that would make possible comparisons, as indicated above.

Principles Governing the Choice of Methods

The methods outlined above by no means exhaust the possibilities of handling the problem of joint costs; for the purposes of this study, however, they are sufficient to form the basis of the discussion to follow.

In determining which system is best adapted to the individual case, there are several fundamental considerations which must be taken into account. In the first place, the relative values of the joint products are important. If the value of the by-product is an insignificant proportion of the value of the total product, there is obviously no sound reason for determining an accurate cost for that by-product. The resultant figures could hardly pay, in terms of information produced, for the expense involved in arriving at this cost. If the value of the by-product is a substantial proportion of the total value, the desirability of obtaining an "equitable" cost becomes proportionately greater, in spite of the added expense.

In the second place, the results to

[3] With the figures here assumed, the amounts chargeable to each per thousand feet would be as follows:

Lumber		Veneer	
700 feet at $50 per thousand	$35.00	300 feet at $100 per thousand	$30.00
		700 feet (loading) at $50 per thousand	35.00
	$35.00		$65.00

be shown have a decided bearing on the method to be used. If the system of cost finding operates to enable the company to record a large profit on the main product, with a large loss on the by-product, or vice versa, it is hardly desirable. The loss on the one product is apt to be taken as a matter of course by the management, while the huge margin shown on the other—generally the main product—reduces any stimulus, which otherwise might exist, for the management to enhance the efficiency of the operating plant. A small margin of profit tends to keep any production manager "on his toes." Granting that any method of distributing costs may be arbitrary, nevertheless the results produced by such a method should be reasonable to say the least.

In the third place, the information which the management particularly desires forms an important consideration in the determination of a system to be installed. After all, cost records are not compiled for the sole purpose of accumulating dust; they are one of the tools of management, and should be shaped in such a way as to make them most useful.

Finally, the labor and expense of operating a cost system is a strong factor. Any system which does not return, in saving and efficiency, the expense of its operation, has no conceivable justification.

Application to Specific Cases

In the production of "nitre cake" by the Vitex Chemical Company we have an outstanding example of a case where the by-product is an insignificant proportion of the total value of the products, being less than 2% thereof. It seems hardly worth while to attempt a "fair" distribution of those costs which are incurred jointly. If it is desirable for any reason to keep that proportion as low as possible—variations may arise according to differences in the quality of the raw material—a statistical record of quantity figures at the end of each period will provide the necessary information regarding fluctuations in the proportion without the necessity of analyzing costs. Accordingly, it is suggested that in the nitric acid process the company deduct the selling price less selling and handling charges of the "nitre cake" from the total cost of the process to determine a cost of the nitric acid. This is the method by which waste is treated in many manufacturing concerns, notably in the textile industry. In order to avoid the variation in the cost of nitric acid computed in this way due to fluctuations in the quantity of the by-product produced or fluctuations in the selling price of the by-product, standard figures based on an average over a given period of time could be used.

In the case of the muriatic acid process, there is an entirely different situation, hinging on this matter of proportionate value. The value of the by-product—or better still, joint product—"salt cake" is approximately 80% of that of the muriatic acid, or about 44% of the value of the total product. It is obviously as desirable to obtain a cost for the one as for the other; in order, first, to enable the company to determine a profitable selling price for each, and second, to provide a satisfactory means of computing the profit on each. Based on the soundness of this conclusion, the deduction method discussed above is inapplicable in this instance. Methods 3 and 4 may likewise be ruled out, inasmuch as they are based fundamentally on the amount of raw ma-

terial which goes into each product. There is no possible means of knowing, in the case of the muriatic acid process, how much of the raw material is applicable to the finished muriatic acid and the "salt cake," since they are produced from common material in response to a chemical change.

By a process of elimination, Method 2, that of distributing costs in relation to value of finished products, seems to be the most clearly applicable. As indicated above, the plan is arbitrary, since the value of the finished products may have little relation to the cost of producing each. And yet, in a case such as this, any method used must necessarily be arbitrary; the basis of choice must rest on the apparent reasonableness of each method under consideration. The chief argument for using value as a basis of allocation in this case—or in any case where a better system does not present itself—may be summed up briefly. The cost of any product in the commercial world generally bears a fixed relation to the selling value of that product. It ranges from 50% or less for a product which requires a large expense of distribution before it is placed in the hands of the consumer to 75% or 80% for a product for which little distribution expense is incurred. Products similar in nature and use frequently bear much the same relation of cost to value, since they are for the most part distributed through the same channels. If this be true, what could be more natural or reasonable than to distribute the joint costs of the muriatic acid process to the products of the process in relation to their selling values? Our assumption has, of course, ignored the fact that a larger margin of net profit might be expected on one product than on another; the quantity of "salt cake" placed on the market is automatically set by the quantity of muriatic acid produced, while the demand for "salt cake" may not be sufficiently great to absorb that quantity at a price which will yield a reasonable profit. In the absence, however, of a better method, as it is quite impossible to measure this expected difference in profit, the value method presents a substantially logical means of distributing the costs in this case.

To repeat, the variations in cost, due to the constant fluctuation in the selling value of each of these products and the change in relation of quantities of each produced, can be partially eliminated by the use of standard values to be regulated only as conditions change permanently.

The case of the veneer company is, in some respects, simpler than either of the other two; in other respects, more complicated. The principal difference lies in the fact that, in the case of the Crocker and Lang Company, the problem is one of distributing fairly to the products the cost of raw material, while in the case of the Vitex Chemical Company the problem is one of distributing labor and burden costs in addition to raw material costs. In the former it is possible to identify the raw material which goes into each of the finished products; in the latter, no such identification is possible, for reasons which have been discussed.

Herein the problem of the veneer company seems less involved, and yet this apparent simplicity introduces additional complications which must be considered. It may be argued that, inasmuch as the raw material may be identified throughout, the logical methods of allocating its cost is to charge it to the lumber and veneer in proportion to the amount which goes into

each, that being the universal practice of manufacturing concerns. Where lumber, however, is produced from logs suitable for veneer, which costs more than twice as much as logs necessary for the manufacture of lumber of comparable grade, the result of charging in raw material on the basis of consumption is obvious. The lumber will be sold at an enormous loss, which can be offset only by extraordinary profits from the sale of veneer. It seems, then, desirable to eliminate this possibility from the discussion.

Method 1 likewise seems hardly to be the proper solution in this case. In the previous discussion of that method, the statement was made that its applicability was properly confined to cases where the by-product was an insignificant proportion of the total value of the finished products. In the veneer case lumber is approximately 20% of the value of veneer, or about 16⅔% of the value of the total. It is of more than insignificant importance. The company should devise some method of checking the efficiency of its lumber operations, as well as that of its veneer department, since inefficiency in the lumber side of the business would be reflected to a considerable extent in the profit and loss statement.

Method 2, that of using value as a basis of distribution, has a great deal to recommend it in this case. As stated before, its major drawback is that it is strictly arbitrary, and desirable only where a more effective method cannot be found. Method 4 combines practically all the advantages of Method 2, with some in addition. Briefly stated in its application to this case, lumber operations would be charged for raw material at a price which the company would have to pay were they purchasing logs solely for the purpose of manufacturing lumber of comparable grade with that which it actually produces as a by-product.

As far as the manufacture of lumber is concerned, this method places the company on a common basis with competitors in the lumber field. Lumber operations are not at fault because raw material costs are more than they would be under different circumstances. That is a fact which arises as a result of the veneer operations, and as such the costs should be properly charged to veneer. Moreover, the value of the lumber in relation to the value of the veneer is so great that inefficiencies in the former process will seriously handicap the company. By the determination of costs on a basis comparable with other concerns in the same line, the company is enabled to measure its own efficiency as reflected in the profit and loss account for lumber.

Under this system of charging in raw material costs, the company should show a profit on both veneer and lumber, assuming good and progressive management. Each product bears a "fair" proportion of the material costs, the veneer being charged to a certain extent with the waste which goes with the manufacturing of lumber out of logs which are suitable for veneer. The difficulty of obtaining market quotations for logs suitable for lumber is not serious. The figures need not be exact at any one time, while the use of standards will very much simplify the cost figures.

Conclusion

Throughout the discussion the impression may have been gained that whatever the method of cost finding in use, it is desirable that a profit be shown on each and every one of the products. Such a situation is, however,

not necessarily desirable. If a joint cost method is chosen solely or largely with this end in view, those responsible for its installation are deceiving themselves. The figures are being juggled to produce a result which, if nothing else, looks well on paper, and is likely to produce a favorable effect on the stockholders or others interested in the financial statements of the company.

Under certain circumstances, of course, it is desirable to disguise large corporate profits, but where the large profits on one product are necessarily offset by losses on by-products, any intelligent appraiser can see the justification for the situation.

There is another popular fallacy in the handling of joint costs. Some cost accountants would lighten the burden of cost bearing on product A, by charging more than a fair amount to product B, simply to enable product A to compete more favorably (or undersell) in the market for that product. No amount of burden shifting, however, will alter the situation. The price for which an article will be sold, with the exception of those produced on a cost-plus basis and those which are the result of natural monopolies, is in general determined on a competitive basis. It is a matter of selling policy; cost finding in nearly all cases has little to do with selling price. The theory of shifting costs in order to enable a company to compete more favorably is therefore unsound.

Finally, it may be reiterated that no attempt has been made to exhaust the subject of joint costs, nor the various methods by which they can be handled. Besides the existence of a great many methods which have not been discussed, those which have been treated are subject to many modifications and ramifications. Suffice it to say that the problem is a live one in many manufacturing concerns, the answer depending upon local factors and the results which the cost accountant is desirous of showing. In the above discussion, no great emphasis has been placed on simplicity. It is, however, a real consideration. A complicated system is apt to be unwieldy and inaccurate, incurring a large amount of unnecessary expense and useless trouble in its operation.

CASE STUDIES IN DIRECT IMPORTING

THE tendency toward greater directness which many manufacturers have shown in recent years in the selling of their products has manifested itself also in the field of purchasing, and since the importing of materials from foreign countries is but one phase of the general field of purchasing, the question of so-called direct importing has become one of considerable current interest to manufacturers, or others who require imported materials. It is the purpose of this discussion, in presenting the cases which follow, to examine the application of direct importing in several concrete instances, and to determine, if possible, some of the principles or circumstances which govern its feasibility.

"Direct importing" is used here to imply the circumventing of some of the ordinary steps involved in importing materials from foreign countries, by the user going or sending directly to the foreign country in question to make the necessary purchases, instead of buying in the domestic market from an American importing merchant.

Direct importing in every case, there-

fore, implies the going or sending abroad to purchase in the foreign country, but there are, however, several degrees of directness possible within the foreign country. For convenience these may be grouped into three divisions, which form the classification for the cases that follow.

In the first place, the American purchaser may buy directly in the regular marketing centers of the foreign country. In this case the actual purchases may be made either from a regular foreign exporter whose business it is to assemble and export goods, or from other ordinary merchants, brokers, or collectors in the foreign market; or the purchases may be made at auctions, fairs, or the like. In each case, however, the purchase is made in the regular foreign market and from ordinary dealers or other regular sources.

In the second place, purchases may be made directly from the actual producer in the foreign country, without going through any of the ordinary middlemen, as in the first case. This would, of course, be a more direct method.

Third, and most direct of all, the American user may go so far as to secure direct control over the actual source of supply. This may be done either by direct supervision over the existing producer from whom he buys, or by undertaking actual production within the foreign country, as, for example, a rubber company which establishes a plantation of its own.

I. Direct Purchasing from Foreign Merchants

A case which illustrates direct purchasing from foreign merchants is that of the Kennard Leather Company of Boston. This company tanned each year a total of about 3,000,000 sheepskins, approximately 40% of which were imported from foreign countries. These countries were chiefly South African and European, including England, Scotland, and Ireland. Other markets for sheepskins were Australia and India. Purchases previously had always been made from importing merchants in Boston, never from brokers, because the latter did not provide a means of direct redress in case of dissatisfaction. During the war period the foreign purchases had been discontinued, but while preparing for their resumption in 1919, the manager of the buying department suggested to the other executives that inasmuch as the company had found it desirable to send its own buyers into the domestic markets to make direct purchases, it might also be found advisable to make foreign purchases in the same way, in order to save the importer's profit and to insure adequate supplies of the right quality.

A few competitors of the Kennard Leather Company were already purchasing their sheepskins direct in the foreign primary markets. Usually they kept only one buyer abroad, either in Europe, South Africa, India, or Australia. The manager of the Kennard Leather Company, however, felt that if direct importing were to be inaugurated, it would be necessary to have at least two foreign buyers immediately, one in South Africa, and one in Europe. Eventually, he believed, one or two more would probably be necessary. Lamb slaughtering was done in the summer and varied naturally between countries where the summer season came at different months of the year. One buyer, therefore, by considerable and rapid traveling could possibly cover several markets.

The buyers selected would have to be not only good judges of sheepskins,

but aggressive enough to make prompt purchases at satisfactory prices, and, moreover, capable of establishing desirable relations with foreign merchants in the various markets where purchases were to be made. Salaries for such buyers would probably be from $4,000 to $6,000, and expenses while abroad in addition to salary were estimated to be between $10,000 and $12,000 per year. It was probable, however, that the expense, in proportion to the purchases made, would be less than the gross margin received by the Boston importing merchants, which varied from 2½% to 5%.

Besides the advantage of insuring at all times an adequate supply of the desired grades of sheepskins, it was believed that especially advantageous purchases of large or special lots of skins could often be made at the openings of markets or at other times, at very attractive prices. Buyers in the foreign markets could, moreover, provide desirable information regarding climatic, economic, and price conditions, and also regarding the quality and probable amount of skins available in the various foreign countries.

The Kennard Leather Company decided in favor of direct importing and in 1919 sent two buyers abroad, one to Europe, with headquarters at Paris, and one to South Africa, with headquarters at Cape Town. After several years' experience with the plan, the company was satisfied that it had been successful in insuring supply and quality, in furnishing desirable information, and in reducing the cost of purchasing.

Soundness of the Decision

The decision in this case is believed to have been sound for the market in South Africa, but somewhat questionable so far as the European markets were concerned.

In South Africa the market for sheepskins is not so well organized as in Europe; hence the possibility of effecting economies and securing more desirable grades of skins through direct purchase would be much greater there than in Europe. In South Africa, moreover, the market is concentrated in comparatively few centers, and the English language is spoken in practically all of them. One buyer, therefore, could probably cover them all satisfactorily.

The markets in Europe, to the contrary, are widely scattered upon the Continent and in the British Isles. Hence, in order to cover them adequately, a buyer would, in addition to his other qualifications, have to possess an intimate knowledge of several languages. The difficulty of finding such a buyer is manifest. The expense and time consumed by a buyer in attempting to cover all the leading markets for sheepskins in Europe would, moreover, be so great as to cast considerable doubt upon the economy of the plan, to say nothing of the difficulty of establishing really satisfactory relations in very many of the markets among which the buyer's efforts were so widely scattered. It is doubtful, also, whether the information about market conditions, the quality of skins available, and the like, which a buyer in Europe could provide the Kennard Company would be as satisfactory or complete as it could get from other regular sources.

For the less highly organized market of South Africa, however, information from regular sources is neither so easy to obtain nor so reliable as that from European markets; hence the information which direct buyers could provide would be of very real value.

Importance of Direct Importing for Insuring Quality and Supply

Apart from the qualifications just made in distinguishing between conditions in South Africa and in Europe, the Kennard case illustrates the importance of direct importing for insuring an adequate supply of the desired quality of materials. The Kennard Leather Company had occasionally, in times of high or sharply rising prices, found it difficult to get the amount and kind of skins that it required. Direct purchasing on the foreign markets would very largely solve this problem, since the company would not have to depend upon the amount or the grades purchased by some one else. Since it was a proper selection of various grades rather than simply high quality, as such, that the Kennard Leather Company required, its buyers in South Africa would be especially useful in securing the proper grades by personal selection, since the market grades there were not entirely reliable.

Greater Merchandise Risk Incurred by Direct Importing

While economies in purchase could doubtless be effected by direct importing, additional merchandising risks would also be incurred, because of the longer period between the purchase and the tanning of skins. Besides the greater risks of price changes during this period, more capital would be required and the carrying charges would accordingly be increased. Finally, the company would have little redress, in case purchases proved unsatisfactory, for it could hardly reject or return skins purchased by its own direct agents in the foreign markets.

BUYING CRUDE RUBBER IN THE PRIMARY MARKET

A case in which direct importing from foreign merchants was considered undesirable is that of the Van Houton Rubber Company. This company was a medium-sized manufacturer of tires and other rubber products, and consumed about 11,000 tons of rubber each year. This compared to about 60,000 tons used by each of several of the larger rubber companies. The greater part of the rubber used in the United States was imported from Singapore or Colombo.

Since 1913 the Van Houton Rubber Company had been purchasing its rubber from a large British merchant shipping company which had connections at Singapore and Colombo, and which maintained representatives in New York City through whom the Van Houton Rubber Company placed its orders.

In March, 1923, one of the directors of the Van Houton Company proposed that the company revert to the plan followed before 1913, of maintaining its own buyers in the primary rubber markets of the East. He stated that many of the company's large competitors employed their own buyers in the auction at Singapore and Colombo and that if these companies found it advantageous, the Van Houton Company should be able to secure the same advantages.

The chief reasons why the company had maintained direct buyers before 1913 were, first, the lack of uniformity in grading rubber, and second, the need of keeping in close touch with plantation conditions, which at that time could be done satisfactorily only through information supplied by the company's own agents, or buyers. These objec-

tions, however, had been practically eliminated by 1923, in the natural course of the rubber market's development.

Through its connection with the British shipping company, moreover, the Van Houton Company received daily cable reports on marketing conditions. These cables were sent by the British company to its New York representative, who immediately wired them free of charge to the Van Houton Company and other customers. A code of numbers was used to describe the various grades, of which there were about 100, and these numbers could be entirely relied upon to represent accurately the grades they were intended to describe. The cable reports gave full particulars about prices for each day, and also gave the names of the manufacturers or brokers who were heavy buyers on the particular day.

The Van Houton Company maintained an inspector at Singapore who examined all shipments of rubber which the company had purchased. His salary, however, was paid by the British merchant company.

Comment

The Van Houton Company decided against the proposed change. The reasons for this decision appear entirely sound. For here the market, although indeed concentrated, was a highly organized one, and the information received about it was complete and reliable. Moreover, it cost nothing directly, whereas the cost of getting daily market information by cable from its own direct buyers would be extremely high.

The cost of keeping foreign buyers in the Far East would also be very great, for few Americans were willing to remain more than three or four years in these Eastern cities because of the unpleasant living and social conditions. The periodic changes in buyers thus occasioned would be costly. Moreover, good buyers would be difficult to find and necessarily would require very high salaries to induce them to live in either Singapore or Colombo. While, therefore, these elements of expense might not be so important for a very large company, it is believed that for the Van Houton Company they would more than offset any advantage that could be gained from the saving of the middleman's profit. The opportunity of making especially advantageous purchases in this case would also be limited by the auction character of the rubber market, and by the restrictions imposed by the so-called "Stevenson Plan."

There was, finally, the possibility that if too many American rubber companies pursued the direct buying policy it might result in their buyers bidding against each other at the primary rubber auctions, thus artificially raising the prices. This was believed to be one reason why the largest rubber company in the United States purchased all its rubber through a New York brokerage firm.

II. Direct Purchase from the Foreign Producer

The Wanzer Company case which follows was one in which the second method, of direct purchase from the foreign producer, appeared desirable. The Wanzer Company in Philadelphia was one of the largest manufacturers in the United States of linoleum and roofing, with annual sales of about $25,000,000, approximately one-eighth of which were sales of linoleum. For the manufacture of this linoleum, the

company used each year about $1,000,000 worth of burlap, almost all of which came from Dundee, Scotland, where the methods and materials used in its manufacture produced a highly satisfactory product. Purchasing had always been done through the four or five sales agents of the Dundee mills which were maintained by these burlap manufacturers in New York City.

The sales agents carried only small stocks, so that large burlap users such as the Wanzer Company had to have shipments made directly from Dundee, and although the sales agents inspected these shipments upon arrival, the purchasers entered them through the customs.

The Wanzer Company was dissatisfied with the existing method of purchasing its burlap for two reasons. In the first place, it had difficulty in getting prompt delivery on its orders, and because all complaints or requests had to be made through the New York sales agents, it was difficult to bring emphatic pressure to bear directly upon the manufacturers in Dundee. Occasionally delays of one or two months occurred in getting orders filled, and since only about a 40-day reserve stock of burlap was carried by the Wanzer Company, either shipments on fast passenger ships at excessive freight rates had to be used, or the company had to purchase burlap from other manufacturers, or from the small stocks of the sales agents in New York. The second chief source of dissatisfaction was the great difficulty encountered in coming to satisfactory price agreements with the sales agents. Because of the very keen competition in the linoleum field, the Wanzer Company set its own price limit for burlap, and then attempted to come to an agreement with one of the sales agents. These agents, however, could take no action without the approval of the Dundee mills which they represented. The result was usually a long-drawn-out period of dickering and arguing over price with the Scottish manufacturers before any satisfactory agreement could be reached. The Wanzer Company believed that these delays in delivery and the arguments over price could be overcome by sending a representative direct to Dundee, who could make arrangements personally with the burlap manufacturers. The total expense of maintaining a representative in Scotland would be only about $10,000 to $12,000 a year, or about 1% of the total cost of the burlap purchased. The advantages that could be gained were believed to be well worth this additional expense; consequently, the company decided to adopt the plan of direct purchase from the Dundee manufacturers and to place only enough small orders through the sales agents in New York to retain their good-will.

Comment

The conditions in this case made the advantages sought for very definitely possible. The market, in the first place, is highly concentrated—in a single city. The distance abroad is comparatively small, and no particular inducements would be required to keep a buyer in Scotland, as contrasted, for instance, with Singapore. Direct buying is also favored by the long period of advance purchasing which is necessary here under any plan of importing to insure an adequate supply of burlap on hand at all times. The long period gives ample time for the Wanzer Company to communicate with and instruct its representative in Dundee. Prompt delivery is very essential; considerable

bargaining as to price is evidently necessary; moreover, personal selection for quality is desirable; all of these objectives are better accomplished by a direct representative. While, therefore, it may not be possible to save a great deal in the actual price paid for burlap, the other advantages which can be secured are sufficient to make direct importing desirable.

III. Actual Control of Source of Supply

A. Purchasing from Supervised Producers

In the cases considered above, the buyer went, first, to the foreign middleman, next, to the foreign producer. In some cases it may be desirable for him to go even further and to undertake supervision over production itself.

In the case of the Lamberti Importing Company, the control of quality and grade was so important that such a course was necessary. The company imported a variety of Italian food products, which it sold to wholesalers and retailers in the United States. Of the $10,000,000 annual purchases, $500,000 was for cheese, half of which was of one particular kind, coming from the neighborhood of Rome. This cheese was sold under the company's private brand, and uniform quality was essential. It was made by individual shepherds, who sold it to salters. The salters cured and aged the cheese, finally selling it to wholesalers, who, in turn, sold it to foreign importers.

When the Lamberti Company bought from these wholesalers, it had trouble in getting cheese of uniform quality. Accordingly, in 1919, it attached four buying agents to its Rome office, who were to purchase direct from the salters. The difficulty of irregularity in quality continued, however, and after three years' use of this method, the company decided to buy directly from the shepherds, and to conduct its own salting establishment at Rome.

In this way the two main causes of poor quality were eliminated. In the first place, the company could select those shepherds who had healthy, well-fed animals, and who were cleanly in their cheese making, while the salters took any kind of cheese offered them. In the second place, the company could be sure that the salting process was properly done. Although the process was simple, individual salters varied considerably in their methods.

This method of purchasing would not entail much increased expense. The shepherds were all located in one vicinity, and buyers could be obtained who would have no trouble in establishing and maintaining relations with those who made the best product. Because the fresh cheese was perishable, the salting had to be done in Italy, but no heavy investment was necessary, since the process could be carried out by a small number of employees in rented space in a bonded warehouse. As an offset to the expense, the company would save the salters' profits, which averaged 15% of the gross sales. It would be purchasing in as large quantities as the average salter, and hence would be at no price disadvantage.

B. Actual Control of Source Production

The final step in circumventing middlemen is taken when the buyer decides to undertake the actual production in the foreign country. This ultimate stage of "direct importing" is illus-

trated by the case of the Satterlee Company, where the primary motives were the defeat of a monopoly and the maintenance of an adequate supply of raw material. The company manufactured about one-fifth of the binder twine used in the United States, the chief raw material for which was sisal. Three-fourths of the world's output of this fiber came from Yucatan, the remaining production was in scattered regions, all within the tropics. The fiber was obtained by macerating the leaves of the hennequin plant, which required seven years to mature. After maturity, constant stripping of the fibrous leaves was necessary, or the plant would bloom and die. Consequently, production, once started, could not be curtailed without almost complete loss.

In 1915 the state of Yucatan passed legislation to control the sisal market, and a monopoly was formed which managed the sale of sisal in the United States through a subsidiary corporation, which also made financial advances to the growers. From 1915 to 1920 American purchasers had to pay the prices demanded; the monopoly, however, had to keep its price below that of possible substitute products, such as manila fiber. Independent growers were unimportant, and kept their prices in line with the monopoly.

In the price drop of 1920, the monopoly's sales and finance corporation found itself heavily stocked with sisal, for which it had already paid the growers, but of which it could not dispose. Although a reorganization was necessary, the monopoly continued to function under a similar plan of organization, and the surplus stocks were gradually disposed of.

The Satterlee Company believed that the prices charged by the monopoly were too high, but it continued to purchase Yucatan sisal, in order to secure uniformity of quality in its product. After 1920, in addition to the continuance of a higher price than was justified, the monopoly further antagonized the company by shipping two cargoes of the stocked supply of sisal which had deteriorated so much as to be useless. The company considered court action, but previous investigation by the Senate and Department of Justice had brought no results, and not much could be expected along this line. Previous attempts to establish a buying association had not been successful. The alternative seemed to be the purchase of a private sisal plantation.

During the winter of 1923 the owner of a sisal plantation in Cuba offered to sell it to the company at an advantageous price. Its annual production was then equivalent to 5% of the company's requirements, but additional planting would bring the proportion to 10%. With this amount of sisal as a minimum, the company could use substitutes, and thus, if necessary, stay out of the sisal market altogether. After considering the various disadvantages of the plan, the company decided that purchase was justified, and bought the plantation in the spring of 1924.

Comment

Under the circumstances, the company's decision was probably correct—it purchased the plantation only as a last resort. Except under some such exceptional conditions, however, such a development is accompanied by considerable risk. The problem involved is essentially that of forming a "vertical" combination; the fact that the raw material is obtained abroad does not alter the basic situation, and is likely to add further complications.

The problems of management in a foreign country are likely to be difficult —in this case particularly so, since hennequin had not been extensively raised before in Cuba. There is the time element involved—inside of seven years the monopoly may again break down as it has already done once before. The company had no accurate information as to the costs of the Yucatan producers nor as to the probable costs of the Cuban plantation. It is possible that the monopoly could cut its price considerably and still make a profit. In that case the Cuban plantation would be at a disadvantage if its costs were higher, and the company could not profitably continue to produce its own sisal. Yet if it stopped producing hennequin the plants would bloom and die, and a heavy loss would be incurred.

These points illustrate some of the problems which such a development may raise. A company must decide whether it wants to undertake not only the development of a vertical integration in its industry, but also the risks incident to foreign operations.

IV. Summary

If any generalization may be drawn from the preceding discussion, it must be that each case should be decided on its own merits. There is no rule which will tell an American buyer when he should, or should not, import directly. The distance he should go in bridging the gap between himself and the producer will depend not only on the type of foreign market, and the type of product to be bought, but on the customs of the trade, and the size of his prospective purchases. The very large buyer may be able to disregard trade customs, while the smaller firms cannot be so independent.

If the volume of his business and the trade customs make direct purchasing possible, the buyer must consider the foreign market. Where the existing marketing facilities are inadequate, direct purchasing may be desirable or even necessary. It was to overcome poor marketing arrangements that the Wanzer Company went direct to burlap manufacturers in Dundee. On the other hand, the Van Houton Company found the rubber market so well organized that no real advantage could be gained by direct importing.

A limiting factor in direct purchasing is the concentration of the market. If it is scattered, and the marketing centers are many and widely separated, too many purchasing or collecting branches may be necessary.

As to the product itself, certain characteristics may make direct purchase desirable. The necessity for special selection for quality or grade, the danger of inadequate supplies, the adaptability of the material for cargo or bulk shipments, or the need of special care in transportation, are all factors which might lead a buyer to make his purchases abroad.

When the characteristics of market and product make direct importing seem feasible, there are several possible advantages. Quality may be better supervised, as the Lamberti Company found. Unusual opportunities may arise for obtaining special bargains, which would be open only to buyers present in the foreign market. In some cases better market information may be obtained by buyers than that available in America. There is, moreover, always the chance of saving the middlemen's profits, fees, and commissions.

As offsetting factors, the importer must consider the increased expenses caused by buyers' salaries, traveling

expenses, or the maintenance of offices abroad. These may more than offset the savings in the purchase cost. In addition, the lengthened inventory period which foreign purchase entails causes greater risk from price fluctuations, and increased capital requirements to carry the goods. If the market is fairly wide, and the purchasing firm depends entirely on its own buyers, there is the danger of their not being able to cover all the possible or desirable markets. On the other hand, in a concentrated market buyers from a number of competing firms, by bidding against one another, may run the price up higher than the actual condition of demand warrants. There are, in addition, certain unchanging risks, normally carried by the middlemen, which the direct purchaser must take over himself. For example, fluctuations in exchange rates must be considered, and proper protective steps taken by hedging. The possibility of loss or delay in delivery of goods is present. Custom-house clearances and other technical matters of importing must be handled by the purchaser himself. Since his own buyers have obtained the goods, he will have greater difficulty in obtaining redress in case an inferior grade is delivered.

Direct importing, then, is not different in its essentials from direct purchasing in the United States. The buyer must decide how many of the middleman's functions he wants to undertake. The advantages to be gained will, to some extent, be offset by the risks which the middleman formerly carried, and by the lack of the services which he gave. In foreign trade these risks and services may prove to be of greater importance than in domestic trade.

It is a matter for the buyer to decide whether, in his particular case, the characteristics of market and product are such as to allow advantages to be secured which will outweigh the disadvantages that are encountered.

LEGAL DEVELOPMENTS SIGNIFICANT IN BUSINESS

IS THERE BUT ONE KIND OF VALUE?

VALUE is probably seldom thought of by the average man except in connection with some particular purpose. One frequently hears it said that although a certain object would not be worth very much to sell, nevertheless, because of the particular purpose for which it is used, it has a decidedly greater value. In addition to the many purposes for determining value in private transactions, there are various other purposes where it is necessary for some branch of the government or the law to set a value upon property, as, for example, in evaluating the property of a public utility company for rate-making purposes, in setting a condemnation value where eminent domain is being exercised, in awarding damages in a suit, or in setting a taxable value.

A Recent Court Decision Says There Is One "Real" Value

Despite this apparent need of having some particular purpose in mind in determining the value of any object or property, a recent decision of the District Court for the Southern District of California maintains that the property of a railroad possesses one kind of value, a real value, irrespective of any particular purpose. The case is that of *The Los Angeles and Salt Lake Railroad Company* v. *United States*,[1] in which the Interstate Commerce Commission was held in error for evaluating the property of the railroad company for rate-making purposes at a different figure from the value that would be fixed for taxation or for purchase and sale.

To quote the words of the court:

> The reports of the Commission we think clearly show that its action was based upon the view that the property of the railroad company in question has more than one kind of value. And in our opinion that view constitutes its fundamental error, ...
>
> Congress . . . . (expressly declares), as has been seen, that the said Commission should fix its value, not for any one particular purpose, but its value—that is to say, its real value—at the time of the fixing of the rates authorized to be charged for such service.

Judging from this quotation, the court not only believes that there is one kind of value for all purposes, but that Congress had the same idea when it passed the Act: that there is such a thing as "real value" regardless of the purpose.

The implication of this decision is of sufficiently far-reaching consequence to warrant a critical analysis of its soundness and logic.

What Is the "Real" Value?

One immediately asks, "What constitutes 'real' value?" Is value a matter of fact, an absolute condition, which is identical under all circumstances, regardless of the purpose involved? The business man can hardly think so. To him valuation is not likely to be thought of except with reference to some spe-

[1] 8 Fed. (2d) 747.

cific purpose. He feels that it is useless to speak of finding the "value" of anything without first having in mind the purpose to which the figure ascertained is to be put, because valuation is a matter involving judgment.

Three Common Meanings of the Term "Value"

There are at least three senses in which the term "value" is used. To the economist, value simply means exchange value, "the power of commanding other commodities in exchange." To others, value signifies inherent utility, or value in use. To still others, value is synonymous with cost.

The meaning one attaches to the term "value" depends on the purpose in view. To the buyer of a piece of property, value means one thing; to the seller quite another. Likewise book value and market value may be widely divergent. In each of these cases, exchange value is the one commonly considered. The existence of several different values in common business usage is apparent to most people, yet they are all forms of what is here termed exchange value.

Value as Construed by Various Branches of the Law

Although "value" usually connotes exchange value in ordinary business transactions, this does not appear to be true in the case of the law. In the latter field the term is used with several different meanings, and, in fact, separate agencies have been set up by the law for the determination of value for different purposes, as the following cases will indicate.

For taxation purposes an assessor sets a value on the property involved, and in case of dispute, appeal may be made for final determination to a tax commission, to a board of appraisers, or to the courts.

Valuation for the purpose of rate-making in the case of public utilities is usually arrived at through the instrumentality of a public service commission with final appeal to the superior courts.

In the case of personal damages only a jury would decide the extent or value of the loss sustained.

A jury must also determine the condemnation value in a purchase or sale case where the right of eminent domain is being exercised.

The law in some states provides for the evaluation of a minority stockholder's interest by arbitration or by a board of appraisers. A similar provision is made for a receiver's inventory.

These are but a few of the agencies recognized by the law for determining value for different purposes. It is reasonable to suppose that these instrumentalities, following different methods, arrive at different results. If there were but one value, a "real" value, applicable in all cases, there would be no need for these different means of determining value; the same method would be suitable on all occasions and under all circumstances.

This possibility of different values for different purposes has also been given recognition by the Supreme Court. In the Missouri Rate Cases,[2] as Whitten has pointed out in his *Valuation of Public Service Corporations,* the United States Supreme Court holds that valuation for purposes of taxation is not necessarily evidence of value for rate-making purposes. Speaking of the valuations placed upon the properties

[2] 230 U. S. 474, 33 Supreme Court 975, June 16, 1913, at p. 806.

by the state assessing board for the purpose of taxation, Justice Charles Evans Hughes, in delivering the opinion of the court, says:

> None of the members of the state assessing board was examined. There is no satisfactory proof of the grounds of their judgment. Nor was it shown that these valuations, made by them for the purposes of taxation, were upon a basis which could properly be taken in determining the fair value, where the sufficiency of prescribed rates is involved and the issue is one of confiscation.

In conclusion:

> It cannot be regarded as sufficient to introduce assessments, or valuations made for the purposes of taxation; and this is particularly true when the principles governing the assessments are not properly shown, and for all that appears, they may have rested upon methods of appraisement which would be inadmissible in ascertaining the reasonable value of the property as a basis for charges to the public.

Recognition of the existence of different values for different purposes is also indicated by the following citation from the opinion of Chairman Stevens of the New York Public Service Commission for the Second District, delivered in the case of *Fuhrmann* v. *Cataract Power and Conduit Company*:[3]

> In purchase cases the inquiry is, what is the exchange value of the plant? What is its earning power, present and prospective? And upon the amount of that earning power depends the determination in the case.
>
> In rate cases, the question in determining the value is not how much has been or can be got out of the property, but how much has been put into it, in order that from that fact it may be determined how much may be reasonably taken out of it in the way of net income. The cause of complaint in a rate case, and hence the point in issue, is whether too much return has been obtained from the public, and whether that return ought not to be cut down to a smaller sum; whether the net income is not too large and should not be smaller. In such a case the earning power of the plant is uncertain until the decision as to the rate is made, because that is the very thing the controversy is about. It follows that in a rate case the earning power cannot be considered in determining what is the value of the property, for the reason that such value depends upon the earning power and the earning power depends upon the rate, and the rate depends upon the decision which may be made in the case.

Justification for Different "Values"

It is not illogical to use one method of valuation for taxation, say, another for condemnation proceedings, and still another for rate-making purposes. The different purposes to be fulfilled justify divergent methods of accomplishment. Valuation for purposes of taxation is concerned merely with fixing a just ratio between the values placed upon the property of different owners, while valuation for purposes of a taking by right of eminent domain must find the fair market value of the property at the time of the taking.

Valuation for rates, on the other hand, according to some authorities, is not measured to the best advantage by exchange value because, as shown above, this value varies with the rate allowed.

Some authorities, Vanderblue and Burgess, for instance, in their book on *Railroads, Rates, Service, Management,*[4] hold that value in the special sense of "invested value" should be the measure of the reasonableness of rates. Yet how is this "invested value" to be measured? Should it be the market value of the outstanding securities, the book value of such securities, or the amount actually invested in the prop-

[3] 3 P. S. C. 2d D. (N. Y.) 656, 1[illegible] A. T. & T. Co. Com. L. 1015, April 2, 1913.

[4] Vanderblue and Burgess, *Railroads, Rates, Service, Management,* Macmillan Company, New York, 1923.

erty? It appears to be extremely difficult to say which of several values is the "real" value for all cases.

Conclusion

This discussion is not an attempt to point out the best method of valuing a property for any given purpose. It is intended merely to point out that the term "value" has several different meanings as employed by the various branches or agencies of the law. It is quite possible that for rate-making purposes Congress and the courts are concerned or should be concerned with but one kind of value, be it cost, exchange value, or what not.

The only issues that we would presume to raise, therefore, are, first, whether considerable confusion could not be avoided by a clearer definition of the sense in which the term "value" is being used in any particular case, since it is evident that the term has several distinct meanings; and second, whether the District Court for the Southern District of California, in the decision referred to, did not err in stating that there is such a thing as "real value" in a general sense, which can be fixed, regardless of "any one particular purpose." It is submitted that, on the contrary, there may be other values that are just as "real" for their particular uses.

VALUATION OF PUBLIC UTILITIES

THERE is much controversy between economists, commissions, and students on the subject of valuation as applied to public utilities. The term "value" as used in the law has so many different interpretations that it has almost ceased to have a definite meaning. Both courts and commissions are called upon to determine the "value" of a property for various purposes.[1] When there is no specification to the contrary, the term may generally be taken to indicate the "value" of the business in the sense of exchange value. The results obtained by courts differ widely from those obtained by commissions because the procedure followed is different. The procedure and results are necessarily different because the aptitude or aim of these bodies is different.

Commissions determine through a staff of engineers, accountants, and other experts, the cost of a property by a variety of methods, and from these costs estimate value. Moreover, they consider the operation of a property and its success by applying tests to determine whether it is up to the standard of operation established by its experts. To aid the advancement of society is a legislative function, and since the commission is a semi-legislative body, it must consider this point of view; on the other hand, a court is not concerned with encouraging advancement and managerial initiative, but primarily with protecting the owner of property from its "legal" confiscation. The courts and commissions differ, therefore, with respect to the method employed to determine value. The point to be determined is the market price, but since the property in question is not offered for sale, personal opinion must be substituted for the actual exchange value.

A court is required to determine whether the value determined by the

[1] For a discussion of these purposes, see the preceding article, "Is There But One Kind of Value?"

commission is fair. The court function is one of judicial review, and the court is more concerned with the procedure than with the conclusion. In some jurisdictions the statutes give the court the complete power of review, but this practice is rare. The court is concerned with two main issues: (1) the mode of procedure by the commission, and (2) the external limits of reasonably bad faith. The commission gathers information to set rates or determine value, and the court must prove that the commission has erred; otherwise, its work will stand. Courts hold commissions in check, but they still allow leeway for initiative and good management.

With these considerations in mind an attempt was made by the Committee on Valuation of the American Electric Railway Association to classify the decision of courts and commissions, and to determine whether there was a trend towards any one basis of estimating cost. This study was carried up to 1923 by the Association, and in a thesis[2] in the Harvard Graduate School of Business Administration this work was brought up to date.

The Committee on Valuation of the American Electric Railway Association classified the decisions in three broad groups: (1) those in which reproduction cost was weighed; (2) those in which reproduction cost was ignored, and only historical investment or prudent investment considered; and (3) those in which the decision was based on special theories. The groups were then further subdivided as follows:

Group I:

Class A—Present reproduction cost considered but not considered controlling

Class B—Present reproduction cost regarded as controlling

Class C—Reproduction costs based on average price of 5 or 10 year period prior to the time of valuation recognized as controlling

Class D—Investment value dominant for new properties, but, when property is more than ten years old, reproduction cost based on unit prices for the ten-year average is taken

Class E—Reproduction cost based on probable unit prices of period in which rates will be in force

Group II:

Class F—Original cost or historical reproduction cost regarded as controlling

Class G—Prudent investment cost regarded as controlling

Group III:

Class H—Pre-war installations at pre-war value, plus actual cost of additions since that time (essentially original cost) regarded as controlling

Class I—Pre-war properties at cost, plus an appreciation for change in general price level; later installations at cost

Class J—Value previously found by commission plus net capital additions to date at cost

Class K—No general policy enunciated.

Inasmuch as the committee did not make it clear what decisions had been covered in 1923, this study starts with the first volume of *Public Utility Reports* for 1923 and goes through volume D for 1925, dated September 24. In the classes given above 185 decisions were found. There were other decisions which were omitted because as reported they did not indicate the basis used for valuation. Classes D and K are omitted because no examples were found either by the committee or in this later study. In this study also, classes F and G are combined because, it was

[2] Horwitz, J. W., *Valuation in Public Utilities*, January, 1926.

impossible to determine from the decisions how to divide them.

A study of the results is not a satisfactory basis of analyzing trends, because, while the number of decisions is considerable, it does not indicate how many commissions decided in a given manner. Presumably if a commission in a certain state decided one way in one decision, it would follow such precedent in all subsequent decisions; therefore, it is important to know the number of decisions by each commission.

Apparently there was very little change during the three years in the tendency to favor reproduction cost or to ignore it as a basis of valuation. In 1923 the former group included 17 states and the latter group 4 states; in 1924 the figures were 16 and 5 respectively; and in 1925 they were 16 and 3 respectively. Arizona, California, Idaho, Oregon, and Wisconsin have been, and still are, regularly using original cost as a basis of valuation for rate making. A glance at the total number of decisions rather than at the number of states seems to disclose a somewhat different story. Classes A and B, which most nearly recognize the importance of reproduction costs, made up 60.3% of the decisions in 1923, 71.9% in 1924, and 80.8% in 1925. If, however, those decisions in classes C, E, I, and J, which recognized reproduction costs to some extent, are added to those in classes A and B, the total percentage recognizing reproduction costs in valuation is almost alike in each year: 79.4% in 1923; 78.9% in 1924; and 84.6% in 1925.

As a matter of fact, however, these figures are of small value. The decisions themselves must be read. The language of the decisions appears to show a real trend away from original cost and toward reproduction cost as the proper measure of value. At first a great many commissions paid lip service to the importance of reproduction cost as a measure of present value, but practically disregarded it in making their decisions. The United States courts and many state courts have insisted on the importance of reproduction cost, and even when the commissions stated that they had considered reproduction costs in reaching their decisions, the courts have overturned the decisions where the evidence showed that little, if any, weight had actually been given to it. This action has had its effect on the commissions and has caused more weight to be given this element than formerly.

It is probable, too, that there is another reason for this change of the attitude of the commissions. Costs began to rise about ten years ago, and, as the utilities have grown most rapidly during this period, the largest proportion of the property of many utilities—particularly of telephone and electric companies—has been built during the period of high prices, much of it during a period when prices were higher than they are today. At the same time, much of the low-cost property has been retired. As a result, reproduction cost at present prices is little higher than original cost.

Furthermore, the custom has grown up of making no deduction for depreciation from original cost, but of deducting it from cost of reproduction. This is illogical but a common practice. As a result, the time has now come when reproduction cost, new, less depreciation, is little if any higher than original cost undepreciated. The commissions, therefore, feel that they can comply with the rulings of the courts without affecting the valuation enough to affect rates. It has probably occurred to them, also, that the time is not far dis-

tant when the use of reproduction cost, new, less depreciation, will yield lower values than undepreciated original cost, and perhaps even lower than depreciated original cost.

At this point it may be well to pause a moment and mention impressions gained from reading the cases. One of the first things noted is that some of the commissions are playing politics rather than giving consideration to the economic effect of their decisions. Such a result is probably inevitable, though it is to be hoped that when regulation has had a longer life, a body of economic doctrines will be worked out by the abler commissions in the more important states, and that these doctrines will form a sort of economic common law for the guidance of other regulatory bodies.

Another impression is the fundamental difference in attitude between courts and commissions. The courts are constantly thinking about the present value of the rights and properties. Protection from confiscation of property is their sole interest, for it is the sole reason for their being brought into the case. The abler commissions, however, have a very different viewpoint. They are concerned to act so that in the long run the public will be well served. They realize that the public will be best served by a well-run and reasonably prosperous utility. They realize, also, that large sums of new capital are constantly needed, and that such capital will not be attracted to an industry unless it is likely to be prosperous, and that this new capital can be most cheaply secured if the income on the securities is reasonable and steady, and the chance of loss on the principal invested is at a minimum. Consequently, the abler commissions have come to realize that they must do everything within their power to assure not only the present prosperity but the long-run prosperity of the utilities if the public is to get the best service at the least cost over a long period of time.

It is interesting to note that the commissions which have had the long-run viewpoint most in mind, and which have had the confidence of the utilities, if absence of appeal to the courts is any evidence, have been those of California and Massachusetts, both of which pay no attention to cost of reproduction in valuations for rate-making purposes, but which are very careful to see that, in so far as it lies in the power of the commission, any properly run utility has sufficient earning power to keep its securities selling above par. Some decisions of each of these commissions during the period covered by this study would probably have been revised by the courts, but the utilities and the public are best served by a policy which tends to make the utilities steadily prosperous over a long period and which aims to avoid extremes of either prosperity or depression.

It has been claimed by many advocates of the original-cost basis for valuing utilities that there is a grave danger to the utility in the reproduction cost basis of valuation; that when reproduction cost becomes less than original cost the utilities will not be able to earn enough to attract new capital, and perhaps not even enough to pay their fixed charges. It has been urged that if the courts and commissions hold to reproduction costs as a measure of present value, the utilities will be in a bad way. Even if the courts continue to hold to this doctrine, it seems unlikely that the commissions will be able to do so. There is no question but that securing new capital is now, and is likely to continue to be, extremely important to the

maintenance of good service; that, even aside from the question of new capital, utilities can best serve the public if they are prosperous; and that the duty of the commissions is to see that the public gets good service and gets it at a reasonable price. The commissions are beginning to realize the importance of quality of service, and they are also beginning to realize that the price of the service is partly dependent on the price the utilities have to pay for capital, which, in turn, is largely dependent on the prospects of steadiness of earnings and absence of risk of principal. Under such circumstances the commissions, in the public interest, will be unable in the long run to put the rate base below the prudent original investment, for, if they did so, the utilities would be able to raise new capital, if at all, only at a very high cost, which would ultimately be reflected in the price of service; and the utilities would be unable to furnish the quality of service which the public desires and should have.

To sum up the results of this study and the thoughts to which it has given rise, the mere tabulation of decisions reveals only a slight trend, if any, in the last three years toward consideration of reproduction costs as an important element in establishment of a rate base; but a real trend in that direction is observable by reading the decisions themselves. This change is partly due to the decisions of the courts and partly to the fact that, with the passage of time, the two bases of valuation have tended to give more nearly the same results. The study of decisions reveals an essential difference in view-point between courts and commissions. Courts are concerned only with guarding against confiscation of property, and not with the long-run economic effect of their decisions; while the commissions —at least the more intelligent ones— are not so much concerned with technical questions of valuation as they are with the long-run economic effect of their decisions on the price and quality of the service rendered to the public. Because of the interest in quality and price of service, and because both of these are bound up with the continued prosperity of the utilities, it is unlikely that the commissions will find it good policy to set a rate base below the cost of prudent investment. Inasmuch as steadiness of income and security of principal are important in the long run, both from the standpoint of the utility and the public, it would seem both equitable and wise to use prudent investment in fixing a value as a basis for rate making,—if valuation is to be used at all.

In an article in the *Harvard Law Review*[3] Mr. Frederic G. Dorety ably presents arguments in favor of reproduction cost as a basis for valuation and rate making. Mr. Dorety brings forward the premise that service cannot be required at less than cost of duplication, and that every project must show economic justification for its existence. He takes the legal point of view that the courts must protect the property from illegal confiscation and hence are required to consider the cost of duplication. Both of these arguments are important but rather severe, and while ably presented do not solve the problem of valuation. Similarly, the study made by Mr. Horwitz and the Committee on Valuation of the American Electric Railway Association is of small value in reaching a definite understanding. It must be remembered in this connection that no rule-of-thumb method can be applied to so immense a problem as

[3] Dorety, Frederic G., "The Function of Reproduction Cost in Public Utility Valuation and Rate Making," *Harvard Law Review*, December, 1923.

public utility valuation, but that the best solution is to utilize the growing wisdom of legislative and judicial bodies and to try for a better understanding of the problem to serve the best interests of the public and the operators. The present confusion is largely the result of an attempt to settle by a formula a problem where the facts are constantly changing and where a decision which was fair yesterday may be unfair tomorrow.

Judgment must be used in solving such a complex problem, and the answer to the entire question of the fair valuation of public utilities is a more capable understanding of the industry, its needs and limitations, and of the demands made upon it by the public. The greater the care that is taken in arriving at a decision, the longer the decision will last, and those rulings on valuation that are, in the long run, most equitable to operators and public alike will gradually prevail and set a standard for the industry.

REVIEWS OF BUSINESS LITERATURE

SOME RECENT BOOKS ON BUSINESS ETHICS[1]

THE growing recognition of the social significance of business and its ethical standards is shown by the nearly simultaneous publication this year of five treatises on business ethics. A comparison of the five books listed below discloses that all deal with the problems of business ethics with greater or less recognition of their evolutionary characteristics, and of the rapid developments now taking place. All five writers are impressed with the growing ethical importance of the trade association movement as a force in the direction of higher ethical standards.

Dean Lord has perhaps the clearest cut conception of the way to solve individual problems. Throughout his book the belief stands out that there are right ethical standards which, when applied to business situations, will solve the problems of living together in business. These standards lie in his mind as applications in the business field of the customary standards of the community at large, such as honesty, fair dealing, and the obligation to service which is the common privilege of all thinking men. His view is that such standards lend themselves to categorical definition and can be embodied in codes of ethics or in creeds governing all possible relations. Except in the comments on these codes, there is little attention paid to the significance of the business group as an element in the growth of ethical concepts.

Somehow, the world so depicted is too simple to fit with my picture of actualities. I am less sure of my facts, and for this reason in part less sure of my ethical conclusions than Dean Lord. For example, I am not sure it is true, as he states, "That the interests of employer and employee are identical is a fact," though much can be said to support the statement if in supporting it one also carefully limits the scope of the statement itself. Nor can we safely generalize that "where arbitration has been adopted in the settlement of disputes, compromises satisfactory to both parties have usually been made." Does it not depend almost entirely on the type of dispute, the type of disputants, and the kind of arbitrators whether this is so or not? Again, is our ethically minded community ready to agree with anything approaching unanimity that "temperance should be modified to the extent of total abstinence in relation to alcoholic liquors"? With the author I am clear that "it is impossible to establish rules to cover all possible cases," but I am not so sure as he appears to be that our conduct in the cases which arise can be readily appraised and settled by applying definite principles. I find myself

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[1] Lord, Everett W., *The Fundamentals of Business Ethics*, The Ronald Press Company, New York, 1926, 196 pp. $2.75.

Lee, James Melvin, *Business Ethics*, The Ronald Press Company, New York, 1926, 312 pp. $3.25.

Heermance, Edgar L., *The Ethics of Business*, Harper and Bros. New York, 1926, 244 pp. $2.

Birdseye, Clarence F., *Arbitration and Business Ethics*, D. Appleton and Company, New York, 1926, 305 pp. $2.50.

Taeusch, Carl F., *Professional and Business Ethics*, Henry Holt and Company, New York, 1926, 370 pp. $3.

constantly struggling with the dilemmas which force themselves on one when sound principles come into head-on collision with each other and have to be weighted relatively in some awkward practical situation. The existence of such ordinary but extremely difficult dilemmas of life is scarcely hinted at. The ethical cases presented for solution in the volume appear too condensed in statement and include too little of the background which must be considered in appraising and applying ethical principles under the changing conditions of life. The book is of value rather as the expression of its author's ethical judgment and for its emphasis on right living as the basis of right business conduct than because of any scientific or philosophical analysis of the subject.

Dr. Lee is less sure of himself and more conscious both of the complexity of life and of that awkward habit which good principles have of coming into conflict when one applies them to specific situations. He rightly insists that before expressing ethical judgments one should be sure that one possesses all the facts of the case. He is also more conscious of the shifting character of the environment in which ethical problems arise, and, therefore, less sure of his standards. In this he appears sounder in his approach. However, the significance of growing group consciousness is little emphasized. The volume is concerned more with current results of ethical evolution than with a scientific analysis of the methods by which ethical standards evolve, or with the basis for future development. Dr. Lee is doing a reporting job. The subtitle of the book, "A Manual of Modern Morals," justifies this limitation.

Dr. Heermance's *The Ethics of Business* is given to us as "A Study in Current Standards." It is in fact both less and more than this subtitle indicates. It is almost entirely limited to the study of trade association standards as defined in codes, with little attention to actual practice or to the extent that practice conforms to standards, and with no attention paid to the standards of other business groups. On the other hand, Dr. Heermance gives us not only a study of current standards within this limitation but he makes a real effort to analyze the way in which ethical progress is made. His methods are scientific, his analysis intelligent. His objective is not to improve the quality of individual ethical decisions nor to define the state of ethical practice in individual situations, but rather to determine the ways in which growing group consciousness and solidarity, as shown in these trade associations, relates itself to ethical evolution. He is concerned with the manner in which the profession of business is emerging ethically from the chaos of individualism rather than with the resulting practices or the difficult handling of individual situations. Of the three books so far discussed, it is the only one which is likely to influence ethical thought or to have any effect on ethical evolution in business. Dr. Heermance has made progress in applying sound methods of research to an intelligently chosen field, and his work will influence the vast amount of further research which must be done.

Dr. Heermance has taken the trade association for his group unit for several reasons. Each association is made up of a considerable number of individual units, so that there is the opportunity for diversity of opinion to work itself out. Furthermore, trade associations are of recent growth, so that the whole process of developing group consciousness lies within the memory of men still actively engaged in business.

Finally, trade associations, in the nature of things, have a tendency to make early efforts to define the ethical standards of their internal relations in the form of codes.

The choice is obviously a worthy one, particularly in a study which is directed toward the understanding of the mechanism of evolution, because the mechanism stands out clearly in this type of grouping. Forces which are at work in all groups here become articulate. For example, the corporation constitutes another group ultimately perhaps more important in ethical evolution than the trade association, but it is more individualistic and less articulate. In fact, in this ethical field the trade association furnishes to a considerable extent the medium of expression of corporate ethical development.

Dr. Heermance's study is as strong and as weak as the character of his chosen subject-matter implies. Trade association standards as they are worked out are related to current practices in certain limiting ways. They have somewhat the same relation to reality that an ordinary carefully thought out discussion by a business economist covering a complicated range of business phenomena has to life. The economist studying a range of phenomena which recur in varied form in a multitude of situations is limited by the range of his own contacts. The recording of facts as to how problems recur has made so little progress in the business field, as compared with the fields of law, medicine, and applied science, that the individual student is forced always to draw conclusions from premises sadly limited in range and scope. At the best, his material is little better than that used by Bracton in his treatise on the English law.

The recording of significant facts about individual business problems is singularly slow in its development. Groups of men sitting on ethical committees in trade associations and formulating codes are therefore attempting to solve their problems and develop ethical concepts without the concrete aid that numerous carefully recorded specific situations would give them. The kind of hard-boiled concreteness which the necessity of struggling with realities in a series of specific situations would compel seems to me lacking in many of these codes. Principles are set up, but one feels that often they are pious platitudes rather than standards of performance. Difficult problems, except within the range of problems met in trying to live together within the group (that is to say, competitive trade practices) tend in general either to be ignored, as in the difficult ethical problems of labor relations, or dismissed with platitudes about morality and service, as are most of the pressing problems of relationship with the public.

Specifically, trade associations, from which many of their members hope to get substantial aid in the difficult practical problems of sound price structure, make no effort in their codes to deal with the ethical dilemmas and social problems involved in this most interesting and important subject. To me it seems doubtful whether trade associations, as such, are likely to initiate and carry through work in such fields. They are composed of too varied elements and seem, consequently, too diffuse and relatively too weak in their influence to do this task constructively. On the other hand, the lack of recorded cases makes a study of these difficult problems almost impossible for the economist or the student of ethics, just as it makes the work of the trade association in establishing standards relatively inef-

fective except where it involves internal trade practices familiar to all in the group.

Dr. Heermance's limitation in his study is largely inherent in the situation. Much research must be done before a satisfactory study of practices can be made and standards evolved in the way that legal principles have developed, that is, as generalizations from many specific cases.

In addition to such research, a study similar to Dr. Heermance's should be undertaken which deals with the mode of development of ethical standards in corporations. In particular, I am confident that such a study of the big corporations would result in much valuable material.

It is quite possible that the big corporations may turn out to be ethical groups of the greatest significance. An evolutionary study directed at the characteristics of these groups, I am inclined to think, would disclose characteristics which must ultimately dominate them and enlist their effective influence on the side of ethical progress. Many are already so enlisted. Personally, I look for more from this source than from the trade association movement as it now exists, because of the higher quality of leadership which may ultimately be expected from the corporation group. Such a study will be more difficult and less concrete than Dr. Heermance's present study. It must be concerned with practical operating practice rather than with codes.

I also look for an increasing development of group consciousness among business men as a whole, which will in the not distant future take over in some larger synthesis many of the more significant and general ethical standards, leaving trade practices for the specialized groups. When we consider those problems of group relationships in business which are concerned with such wider community relationships in business as find expression in the common law and in legislation, or which relate to labor and to the public, the situation appears to require a larger integration than the trade association. The ultimate unit should include the whole field of business management, with a probable subdivision of the service groups such as bankers, accountants, engineers, and lawyers, whose functions, being largely auxiliary and fiduciary, involve a differing ethical emphasis.

While the full accomplishment of this larger synthesis must probably await a considerable further development of individual and corporate standards, there is already a growing group consciousness of this larger scope to which some types of trade associations are contributing notably. The influence of collegiate schools of business in developing this group solidarity as the basis of a profession is beginning to be felt and will increase over the next generation. This broader development will certainly not displace the trade groups, for there are many specialized group interests which cannot be considered in any other way. Nevertheless, the larger synthesis is essential, not only because the dignity which is one of the foundations of a profession cannot otherwise be attained but, far more important, because without it the requisite leadership cannot be secured.

My own interest leads, therefore, in the direction of stimulating the group consciousness of this larger body, in focusing its attention as far as may be on the ethical opportunities for leadership imposed on this group, and in defining, if possible, the relationship between the individual who must struggle with practical ethical situations and the

progress of the emerging profession to which he belongs.

I should have been interested if Dr. Heermance, in his own analysis, had drawn more distinction between the codes of the older professions, which are in large measure efforts to define the results of long evolution in these fields, and the numerous recent trade association codes, which represent largely efforts made by men in the different groups to define, while sitting around the table, the standards which ought to exist in their several trades. These situations appear to me very different in their connotations and, it seems to me, produce significantly differing results.

Mr. Birdseye studies one specific aspect in the evolution of the trade association; namely, commercial arbitration and its ethical implications in trade associations or groups dealing with each other "in homogenous products, commodities, or securities." By his definition of commercial arbitration, Mr. Birdseye limits its scope and his discussion almost entirely to internal trade practices, that is, the development of better methods of living together within the trade. The picture of accomplishment which he draws within this field is impressive and, in view of the failure of the legal profession and the law to develop methods of handling promptly or satisfactorily the complex problems which in our industrial civilization affect the internal relationships of specialized groups, it is of peculiar significance. The fact that this failure of the law is in large part caused by the difficulty of giving proper attention to special group needs in any generalized concept of the law adds to the importance of the subject-matter here discussed.

The book should be studied in connection with Dr. Heermance's results, for the two supplement each other admirably. In combination they give a far more satisfying treatment of the trade association and its activities, roughly defined as internal trade practices. It is in these rather than in the larger groups of community relationships that the trade association will produce its most effective results.

There is, however, one other type of activities in which trade associations have a definite opportunity for accomplishment, coupled with a corresponding danger from lack of vision. This is the field of self-protection and the development of group self-interest. Each trade in this respect inevitably constitutes a "bloc," just as business interests as a whole tend to constitute a bloc, with all the reasons for existence which blocs can universally adduce to justify themselves and with all the inherent dangers from short-sighted, stand-pat, reactionary, or overaggressive combination of specialized interests. In none of these four books are the important problems involved in this type of group activities adequately discussed.

I have left for the last a brief review of the contribution of Professor Taeusch. One of the interesting things about this group of books is the variety of background of the several authors. Dean Lord approaches the problem as a teacher of business, and his book appears to be a collection of lectures to beginners in business, devised in the effort to arouse in them a desire to play the game fairly rather than to give them a philosophy of ethics. Dr. Lee approaches the subject as a journalist reporting present-day facts with his editorial comment. He, again, is using these facts as the basis for instruction intended to arouse a desire to do business ethically. Dr. Heermance sees the problem as a research problem in the evolutionary development of his chosen

field of social ethics. He studies one segment of his field in the effort to discover evolutionary mechanisms as the basis for later work on the side of practical accomplishment. Mr. Birdseye considers one quasi-legalistic development from a lawyer's viewpoint. Professor Taeusch's analysis is philosophical and, as might be expected, is broader in its scope and conception than any of the others. He is concerned not only with business ethics but with the whole problem of group ethics and their philosophical implications as they have developed in the professions generally as well as in business and in the labor group. For these reasons, the volume is one for the student of business ethics to use in conjunction with other more specialized studies rather than as a substitute for them. The discussion is to me more satisfactory than any of the others because of this broad point of view. Dr. Heermance deals with professional ethics in his volume as a step in the development of his own thesis, but not with sufficient thoroughness, as it appears to me, to get out of these developments the significant elements which bear on the mode of development of group ethics generally, and, therefore, illuminate the problems of business ethics. Professor Taeusch, however, does just this in a thoroughly satisfactory manner.

Business from an ethical standpoint is an emerging rather than an established group. The law, medicine, teaching, and engineering all differ in their ethical evolution, but all are much further advanced in their group consciousness and ethical definitions than is business. At the present moment, therefore, I believe that there is more in the history of older professions which will point the way toward sound ethical evolution of business than is discoverable from the study of any existing material about business, or about any business group. Every chapter in Dr. Taeusch's volume, therefore, whether it be his broad philosophical chapters on ethics in general or his specialized treatments of the ethics of other and more developed groups, is pertinent and illuminating for the student of business ethics and its past evolution and probable future evolution. His critical analysis of the ethics of the law with its intimate opportunity to translate its principles into law through the interpretation of specific situations or cases by its own group as judges; his corresponding analysis of other groups where the legal sanction is neither necessary nor perhaps desirable but where other sanctions through group public opinion are operative in more or less satisfactory manner; his demonstration of the dangers of glittering generalities, cant, and flabby idealism which come from the failure to evolve general principles from specific sets of facts or cases and likewise from the failure to test generalizations by applying them to particular cases—all of these are of intense interest to the student of business ethics.

When one considers the further fact that all over Western Europe including Great Britain the nationalization and systematizing of the law, which is a type of social science similar to ethics, waited upon and followed promptly after the recording of specific cases and judicial decisions, the importance of his insistence on the recording and study of actual cases and their interpretation as the basis for the development of ethics becomes evident.

W. B. DONHAM

BOOK NOTICES

Bivins, Percy A. THE RATIO CHART IN BUSINESS. *New York: The Codex Book Company, Incorporated, 1926. 177 pp. $3.*

With the rapidly increasing use of graphic charts by business executives for purposes of analysis and control, the commonly used arithmetic scale chart has become more and more inadequate in many applications to business problems. It is with the view of overcoming inadequacies of the graphic methods known to the average executive that the author has brought out this brief, non-technical exposition of the ratio chart. These charts, often avoided by executives as being too technical in nature or difficult in interpretation, are shown to be surprisingly simple and understandable, even to one with no knowledge of higher mathematics. Perhaps a long step is taken toward this objective when the name "ratio chart" is substituted for the forbidding term "semi-logarithmic chart."

With the aid of illustrative charts, the author brings out in a clear manner the advantages of the ratio chart over the arithmetic chart in various applications wherein the important question is the *rate* of change or relative value rather than the absolute magnitude. Numerous applications of the principle of the ratio chart are suggested in the analysis of sales, operating figures, prices, and other relevant data. The inclusion of a chapter on the use of auxiliary reading scales gives still wider and more effective use to the ratio chart for the translation of slopes and quantities into percentages, and vice versa. On the other hand, the limitations of this type of chart are not overlooked or denied, but are explained, and the means of overcoming them are outlined.

The first section of the book deals largely with the advantages and interpretation of the ratio chart, with only the necessary minimum devoted to the actual construction of the chart. The second section, of less importance to an executive for whom the charts are made up by a draftsman, does not go beyond the knowledge of a person with an elementary knowledge of graphics in its explanation of the construction of ratio charts. The last section contains a bibliography of a number of articles on the use of the ratio chart and a brief review of recent applications of ratio charts by trade magazines, government statistics, Federal Reserve bulletins, and various economic and investment services.

David, Donald Kirk, and McNair, Malcolm P. PROBLEMS IN RETAILING. *Chicago: A. W. Shaw Company, 1926. 780 pp. $5.*

Over 200 problems, taken from the actual recent business experience of modern retail stores, form the foundation for this new work. Problems of unit stores, chain stores, and department stores are presented. The pertinent facts and the questions at issue in each case are clearly stated, but because the book is primarily designed for use as a text, the solutions are not given. The book is divided into six sections: the first is concerned with the elements of retail accounting, the second with the effect of consumers' buying habits on retail policies, and the third with buying, planning, and control. The three subsequent sections respectively contain problems of sales direction and promotion, of store operation, and of control, finance, and general policy.

Dewing, Arthur S. THE FINANCIAL POLICY OF CORPORATIONS. *New York: The Ronald Press Company, 1926. 1281 pp. $10.*

In his most recent work Dr. Dewing has completely revised and enlarged the earlier editions of *The Financial Policy of Corporations* so that this new edition is more nearly a new work than a revision.

The book deals with the financial structure and financial problems of large business corporations. A section is devoted to an elaborate discussion of corporate securities. Next follows a consideration of the various phases of promotion, including a discussion of the promoters' work, the bankers' contribution, and the general principles underlying the financial plan, with especial reference to the different types of industries. Following the course of the corporation, a third section is devoted to the administration of income. Expansion, then failure and reorganization are next discussed. In the discussion of expansion previous editions have not only been revised, but a new

chapter on customer ownership is included. Likewise under the head of failure and reorganization a new chapter has been added dealing with the creditors' committee. Finally, a section is devoted to a discussion of the theory of investments, in which a very strong case is built up for common stocks. Throughout, the book is reinforced by concrete examples and cases drawn from extended research.

Dublin, Louis I., Editor. POPULATION PROBLEMS IN THE UNITED STATES AND CANADA. *Boston: Houghton Mifflin Company, for The Pollak Foundation for Economic Research, 1926. 318 pp. $4.*

This book is a symposium by 19 economists, statisticians, and biologists on various phases of America's population problems. Articles on the increase and urbanization of our population are followed by considerations of these trends as they affect natural resources. Questions of immigration and labor supply are presented in several articles, and the book closes with a section of three articles on the outlook for the future.

As a matter of fact, in spite of the general title of the last section, "Outlook for the Future," each author advances his ideas on the future of our population, considered from the view-point of his particular specialty. Many statistics from various sources are brought together, and although some chapters are by no means light reading, it is not necessary to be a professional statistician to follow the thought. With so many contributors the reader does not look for a unified analysis of the entire problem, leading up to a single conclusion. Differences of opinion naturally crop up, but in one thing all the contributors are agreed: they will make no dogmatic assertions about whose action we can only speculate. Each reader is left to his own opinion, helped by a stimulating discussion and realizing the need of freedom from prejudice in forming it. In no one panacea, be it birth control, immigration quotas, or Nordic domination, can be found the solution to our social problems.

Edminster, Lynn Ramsay. THE CATTLE INDUSTRY AND THE TARIFF. *New York: The Macmillan Company, 1926. 326 pp. $2.50.*

Shall we continue the present tariff duties on cattle and beef imported into the United States? To answer this question the author, who was formerly a member of the United States Tariff Commission, has compressed into 267 pages a brief but excellent history of the cattle industry in the United States; a study of the factors that have operated to change this country from a great beef exporting nation to one which in the last few years has imported more beef and cattle than it has exported; an analysis and description of the competitive situation in Canada, Mexico, Argentine, Uruguay, Brazil, Australia, New Zealand, and South Africa; and finally, a thorough discussion of the tariff problem in the cattle industry.

The tariff duties are discussed from two points of view: their efficiency in protecting the domestic producer, and their desirability from the standpoint of public policy. Mr. Edminster argues that tariff duties will yield small benefit to the domestic producers as a whole because while the duties would probably raise beef prices, the additional supply necessary to meet the increasing demand could be produced in this country only at a much higher cost. The highly elastic nature of the demand for meat leads the author further to believe that higher prices for beef would result very largely in the substitution of cheaper foods, and considerable evidence is adduced to prove that increasing prices for meat do have this effect to a very substantial degree. From the standpoint of public policy, therefore, the conclusion is reached that the duties would have the effect of raising beef prices to the consumer without yielding any proportionate benefit to the cattle industry.

The author brings to the subject a thorough and extensive knowledge of cattle and beef producing conditions in all parts of the world. The descriptive sections of the book are exceedingly interesting apart from any consideration of the tariff problem involved. Statistical material is handled with careful consideration; no attempt is made to force facts and figures to prove desired conclusions. On the contrary, the treatment appears unusually free from bias. Adequate allowance is made for error in data; both sides of each question are fairly presented, and the conclusions drawn are clear and sound. Two appendices, one on costs of production and one on prices, are added.

The study lives up to the high standard of the Institute of Economics, and forms a valuable contribution to the tariff problem as it relates to the cattle industry in America.

Edwards, George W. INVESTING IN FOREIGN SECURITIES. *New York: The Ronald Press Company, 1926. 373 pp. $5.*

Professor Edwards has discussed types of foreign investments, their relation to economic principles, and their effect on public policy. There is a short history of the field of foreign investment, a discussion of the investment trust, and a comparison of British and American methods of marketing securities. The types of foreign securities considered are public credit, investments in corporations and financial institutions, and short-term credits. The final section, termed public policy, discusses imperialistic trends, the need for national financial control in relation to concessions and pledged revenues, and the position of the Monroe Doctrine and the League of Nations in international finance.

Most of the material in the book is gleaned from financial records, and but little original contribution can be acknowledged. Professor Edwards has dealt with the whole field of foreign economic problems and the study is so broad that the result is necessarily sketchy.

Emmons, Arthur Brewster. HEALTH CONTROL IN MERCANTILE LIFE. *New York: Harper and Brothers, 1926. 234 pp. $3.*

Dr. Emmon's book is one of the first to throw light on one of the most recent tendencies in the mercantile field—the development of methods of health control in stores and offices. The study of this problem of health control is the result of the belief that health work could reduce absenteeism and labor turnover, and increase efficiency among salespersons and office workers. Inasmuch as Dr. Emmons has been connected with the Harvard Mercantile Health Work in Boston, his statements of justification of that belief come with the authority of one who has studied the problem at first hand for about 5 years in more than 25 large department stores.

Dr. Emmons first goes into the question of the proper environment, both in the home of the worker and at work, which makes for better health and increased efficiency. He considers in some detail methods of prevention of discomfort and common ailments both in the home, in the school in earlier years, and later in the store. At this point, he takes up the problem of the establishment of health departments in stores and offices and makes practical suggestions as to location, equipment, and personnel. Thereafter follow ideas concerning the proper conduct of such a department; as for example, the necessary procedure of physical examination and the question of the original rejection of applicants because of the findings of such examinations. Upon this follows a discussion of methods for obtaining cooperation of employees in making the health work a benefit to both employees and employer.

Since the experimental work has been done chiefly in department stores and offices, the book necessarily treats only of work in that field. It is of interest to the layman because it indicates a new field of endeavor in the effort to increase efficiency, but it should prove to be of special interest and help to those who are now immediately concerned with the establishment of health departments—doctors, nurses, personnel workers, and office managers.

Foerster, Robert F., and Dietel, Elsie H. EMPLOYEE STOCK OWNERSHIP IN THE UNITED STATES. *Princeton: Princeton University Press, 1926. 174 pp. Cloth, $2. Paper, $1.50.*

Keen interest has been manifested in the recent movement among corporations toward the sale of stock to employees. A wide variety of plans have been introduced, but their ultimate result is still a matter for speculation; most corporations are maintaining the role of interested bystanders. Many arguments have been advanced by sponsors of employee stock ownership favoring the general adoption of similar plans. Nevertheless, such a new departure in the field of industrial relations is fraught with danger for the ill-considered plan.

This study of the provisions of many plans which have been used should be of especial value in giving those interested in the sale of stock to employees an insight into the problems which have been encountered, and the provisions by which the companies have attempted to overcome the practical difficulties which have arisen. It should aid those whose plans have developed defects, by pointing out the manner in which other companies have attempted to cope with difficulties.

The scope of the book is sharply defined. First, it analyzes the conditions found in actual use in various plants, and the results obtained in so far as they are now apparent.

Second, it discusses more generally the policies involved in a scheme of selling stock in the company to employees.

The executive must consider the broader aspects of the ultimate effect on the social structure if this movement becomes widespread before committing himself to employee stock ownership. Third, an appendix which lists companies that have had or have not plans for employee stock ownership and which summarizes briefly many actual plans gives this volume additional practical value.

Nowhere in the book will be found any panacea for the ills of present employee stock ownership plans, nor is any "perfect plan" projected by the authors. The limitations of this volume are the limitations imposed upon the entire movement of employee holdings of stock by the lack of sufficiently illuminating experience. Yet such studies as this assist materially by presenting carefully considered analyses.

Hinman, Albert G., and Dorau, Herbert B. REAL ESTATE MERCHANDISING. *Chicago: A. W. Shaw Company, 1926. 356 pp. $6.*

This book deals with one subdivision of the general subject of land economics. Upon the real estate dealer devolves the important economic function of bringing together the land and the utilizer of land. The merchandising of realty—a commodity with as many grades as there are parcels and grades of which, generally speaking, the purchaser is ignorant—requires a more fundamental sense of responsibility and a more specialized technique than any vocation not now recognized as a profession. Such is the approach of the authors to their subject.

After some discussion of the characteristics of realty as a commodity and some consideration of the peculiarities of the real estate market, the book sets forth an application of the simpler principles of merchandising to the realty field. More than a third of the volume is devoted to the subject of advertising and consists largely of a restatement of the technique of advertisement composition such as may be found in any standard text upon that subject. Real estate market analysis, the business administration of real estate offices, and the psychology of the sale process are treated very briefly. The closing chapter on measuring the effectiveness of merchandising methods indicates a starting point for the statistical control of realty selling operations.

Knight, Melvin M. ECONOMIC HISTORY OF EUROPE (To the end of the Middle Ages). *Boston: Houghton Mifflin Company, 1926. 254 pp. $3.*

This book is an interestingly written volume forming the first part of a general economic history of Europe and carrying that history down to the end of the Middle Ages. Professor Knight begins with the foundations of European economic life in the Near East and Egypt, and carries the reader on to the beginnings of economic life in Europe as seen in Greece and the other early Mediterranean states. Roman economic life and its importance is well discussed before the account is brought down to the Middle Ages proper. The later chapters set forth in an interesting manner the importance of Mediterranean Europe and the awakening and development of commerce and industry in Northern Europe during this period.

The subject-matter covered is so inclusive that limitations on the size of the book necessarily restrict the author to a general treatment of the whole story in a rather outlined fashion, but this sketching he has done carefully, so that his survey gives the reader an understanding of the background of present economic institutions. A good bibliography is appended to each chapter of the book.

Mead, Edward S., and Scholz, Karl W. H. RUDIMENTS OF BUSINESS FINANCE. *New York: D. Appleton and Company, 1926. 307 pp. $2.*

After several previous revisions of his *Corporation Finance,* with a view to concentrating and simplifying the subject-matter, Mr. Mead has now presented, in this new book, the basic ideas of his original work, together with several additions of material by Mr. Scholz. This volume is presented in response to the authors' feeling that such an elementary work will fill the needs of many people who lack sufficient groundwork for the comprehension of the more advanced books in this field.

As in other text-books on business finance, the material is arranged in accordance with the logical development of the subject. From promotion, Mr. Mead's discussion proceeds to capitalization, to management, and to reorganization. Mr. Scholz has presented several sections on the advantages of the business cor-

poration from various view-points, on the business budget, on the treatment of stock dividends, and on legal and accounting principles as they apply to finance.

While the fundamentals of business finance are presented briefly, they are nevertheless clearly discussed, and in a manner especially designed for understanding by younger students. For this class of reader the book will serve as a very acceptable text-book.

Redfield, William C. DEPENDENT AMERICA. *Boston: Houghton Mifflin Company, 1926. 253 pp. $2.50.*

The author's thesis is that to a greater extent than is generally realized America is dependent upon international trade to supply it with commodities of every-day convenience and products essential to its national safety. Self-sufficiency is a delusion. Not only do we import the products of the tropics, many of which are luxury articles, but our greatest industry, the steel industry, has made its recent advances in quality and in variety of products by alloying our domestic materials with metals which must be obtained from abroad. The bulk of the book consists of facts to support this thesis and points out the source and importance of some of the many articles for which we are dependent upon foreign sources. These facts are presented in a popular, readable style. Especial emphasis is placed upon materials which would be necessary in war and of which we do not have a sufficient domestic supply to satisfy even peace-time requirements. Means of alleviating the seriousness of the situation are suggested. The first requisite in finding a workable solution is to realize the extensiveness of international relations.

In the fields of music, science, literature, art, and religion the world has lost its sense of nationality. This is also becoming true in commerce, industry, and finance. In their struggles for advancement nations are becoming more dependent one upon the other and more intimately concerned with world affairs. Only in the field of politics has America failed to discard old prejudices. It is the author's conclusion that our material prosperity is the composite result of the toil of all the world. If we are to continue to advance, we must join forces with the world, cultivate a world-consciousness, and accept our international responsibilities.

Riggleman, John R. GRAPHIC METHODS FOR PRESENTING BUSINESS STATISTICS. *New York: McGraw-Hill Book Company, Incorporated, 1926. 231 pp. $2.50.*

The full benefit to be derived from the use of statistics as a tool of management frequently has been lost because of inadequate and ineffective presentation of the data. Although graphic methods for presenting facts have been developed long since by mathematicians and engineers for the special purposes of their subjects, only recently have suitable methods been evolved for the presentation and interpretation of business data. This book is, therefore, a timely contribution to the general subject of statistical control in business. It is also a valuable supplement to the numerous books on business statistics and statistical method which have recently appeared.

The author has concerned himself primarily with the technique of graphic presentation, devoting little space to general theory. Drawing equipment and its use, the layout, size, and proportions of charts, and methods and styles of lettering are considered in detail. The different forms of charts and their applicability to various purposes are discussed. Methods of duplicating and reproducing charts are presented. The treatment of each phase is detailed and complete, and specific instructions are given for the application in actual practice. The presentation is clear throughout, and is effectively supplemented by numerous illustrations.

Stevenson, Russell A. QUESTIONS AND PROBLEMS IN ACCOUNTING. *New York: The Macmillan Company, 1926. 234 pp. $2.*

The questions and problems in the principles of accounting which make up this volume are grouped in chapters by topics, following certain standardized classifications such as balance-sheets, income sheet accounts, and deferred and accrued items. In addition to strict accounting classifications, there are additional chapters containing problems on the interpretation of reports, ratios, charts, and budgets. The last two chapters are devoted to questions and problems pertaining to federal income tax procedure, and the relation of business law and accounting.

This book will prove valuable to those desiring a comprehensive selection of problems covering the field of elementary accounting.

Walker, J. Bernard. THE STORY OF STEEL. *New York: Harper and Brothers, 1926. 208 pp. $4.*

To the average layman who knows little or nothing about the story of steel, this book affords interesting and illuminating reading matter. With the mining of the iron ore as a starting point, the author follows the ore to the blast furnaces, through the various converting processes, and then through the various forms of manufacture into the finished products. The Bessemer converter and the open-hearth furnace, as well as other equipment and processes, are described in a manner easily comprehensible to the non-technical reader, yet not in such an elementary way as to make tiresome reading for the technically trained man.

Two chapters dealing with the marketing of steel and financing the steel industry have been written by Edmund Brown, Jr., member of the Consulting Board, Brookmire Economic Service, Incorporated.

White, Percival. FORECASTING, PLANNING, AND BUDGETING IN BUSINESS MANAGEMENT. *New York: McGraw-Hill Book Company, Incorporated, 1926. 267 pp. $2.50.*

Increasing competition, supplemented by increasing knowledge, has forced business men to forecast, plan, and budget their operations. Moreover, the growth in size of business concerns has gradually changed the control of activities from a personal to a statistical basis. By far the greater number of firms, however, are not cognizant of the advances that have been made in the way of statistical control nor of the technique by which such control is supplied. This book is written, therefore, for those businesses, both large and small, which desire to replace the present "hunch" method of prediction with the scientific approach.

The author's thesis is that prediction is a guide to conduct, while planning is the scheduling of that conduct; that the four components of every prediction and every plan are: compilation, interpretation, presentation, and application. Under the first heading are discussed factors in forecasting and sources of data. Forecasts of general business, the business cycle, statistical analyses, and graphical interpretation are considered under the second component, followed by presentation of data and correlations. Finally, the practical application of the forecasting and planning activity is presented in the technique of planning and of budgets, and the control of finance, purchasing, production, marketing, and management.

The vast detail of the subject is obvious, and the inquiring reader will be annoyed by the apparently inadequate and summarized treatment given many matters of vital importance and interest. The author, however, has not attempted a detailed presentation of his subject material but, rather, a summarization of current theory and practice. Although the material is well organized and effectively presented, it is to be hoped that a more inclusive and detailed study will follow the present volume.

Wright, Ivan. READINGS IN MONEY, CREDIT, AND BANKING PRINCIPLES. *New York: Harper and Brothers, 1926. 1081 pp. $4.*

The development of the Federal Reserve System, the disturbance of foreign exchange during the World War and the post-war period, and the broadened knowledge of the significance of bank credit in the business cycle have greatly increased the volume of material available for students of money, banking, and foreign exchange. Professor Wright has attempted to select extended readings from this mass of material for use as collateral assignments in introductory courses. For the most part, the selections have been taken from recent books and publications. In contrast with many similar volumes of readings, this book is composed of thorough-going treatments of each subject, instead of excerpts and brief statements.

In selecting readings pertaining to the Federal Reserve System, Professor Wright has drawn heavily upon the reports of the Federal Reserve Board and the excellent letters of the Federal Reserve Bank of Richmond. The report of the Senate committee on currency, published under the title, *European Currency and Finance,* has been used extensively as a source of selections on international financial relations and European monetary conditions. Different points of view on the business cycle are given in articles by Irving Fisher and Wesley C. Mitchell, and a statement of the various cyclical theories is included.